TECHNOLOGY DEPARTMENT

MODERN PLASTICS

JULY 1949

MODERN PLASTICS*

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EDITORIAL

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JUL 1 1949
DETROIT

Concentrate on Marketing

"The kind of competition faced in the past is nothing compared to what you will face in the future if your volume capacity reaches its apparent potentialities." That's what the president of a great department store told the plastics industry at the recent annual conference of the S.P.I. Said one of America's foremost merchandisers, now head of a huge distilling company: "The mere fact that you have a good product is no guarantee that people will buy it."

Speaker after speaker at this meeting (see page 59) emphasized the need for a closer relationship with customers if the industry is to overcome competition from materials that are already well known in the field. Distributors and their salesmen must be taught to know plastics products as thoroughly as do the salesmen who represent plastics products producers. Retail clerks must be taught the fundamental factors that give plastics their sales appeal; they must be able to tell their customers why and how plastics products will meet their needs. But, above all, the consumer himself must be consulted concerning his likes and dislikes. Retailers and distributors who are in constant touch with consumers can be of vital assistance in the business of determining when and why the plastics producer has pleased or displeased his customer.

As a further suggestion to plastics products producers, the retailing and distributing experts, while emphasizing sales psychology, dwelt at considerable length on the necessity for quality products as a necessary corollary to sales promotion. Don't let products go to markets before they are ready, said one speaker. See that they have been consumer tested, said another. Laboratory testing is essential, of course, but there is no test so reliable as a use test by actual consumers. And last, but not least, the word "quality" must be defined by plastics manufacturers. Both retailers and customers are presently befuddled and confused by excessive use of what word to describe plastics products; yet there are practically no measurements of "quality" that the average retailer or customer can understand. A method for quickly supplying a prospective purchaser with facts by which he can judge the value of any plastics product is sorely needed at the retail level.

The plastics industry is taking over an ever-increasing volume of space on the retail store shelves of this country. But how fast that merchandise moves from those shelves is not the sole responsibility of the retailer. It is up to all producers of plastics products to gear their selling operations to the speed and perfection of their production lines.

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Why not see what this variety of products and services can do for you? Send a set of specifications today and learn, without obligation, how Richardson would approach your job . . . find out for yourself how Richardson's "undivided responsibility" can work to your advantage.

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WHY NYLON PLASTIC FOR SAFETY GOGGLES?

A flying spark or metal chip . . . a machine run amuck . . . a squirt of acid. Such mishaps can cause serious eye injuries to welders and other plant workers.

To give workers' eyes the greatest possible protection . . . protection far beyond ordinary requirements . . . one manufacturer set out to produce a super-strong, light-weight safety goggle. In addition to extra-durable lenses, he needed eye cups to withstand the hardest blow and resist heat and perspiration. They had to be light in weight and comfortable to wear. After studying various materials, the manufacturer found *the* material for the job in tough molded Du Pont nylon.

Nylon, he found, has great compressive strength . . . high impact resistance. Even after being squeezed in a vise, the nylon cups snap back to normal shape. These goggles are molded to fit facial contours with comfort, fitted with tough lenses. According to the manufacturer, these goggles will last a lifetime . . . give the worker better eye safety than any previous goggle.

The advantages of nylon, as well as those of other plastics in the Du Pont family, may help you improve your own products or design new ones. It's easy to get all the facts. Write E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, 350 Fifth Ave., New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Ill.; 845 E. 60th St., Los Angeles 1, Calif.

Safety goggles made by Willson Products, Inc., Reading, Pa.

WHAT'S NEW . . . For penicillin powder inhalation, this "Aerohalor"* is made of Du Pont "Lucite"* acrylic resin by Abbott Laboratories, North Chicago, Ill. Abbott uses "Lucite," because it doesn't cause deterioration of penicillin, looks attractive, is easy to clean and resists breaking. "Lucite" also is odorless, tasteless, non-toxic and pleasant to the touch. *REG. U. S. PAT. OFF.

DU PONT
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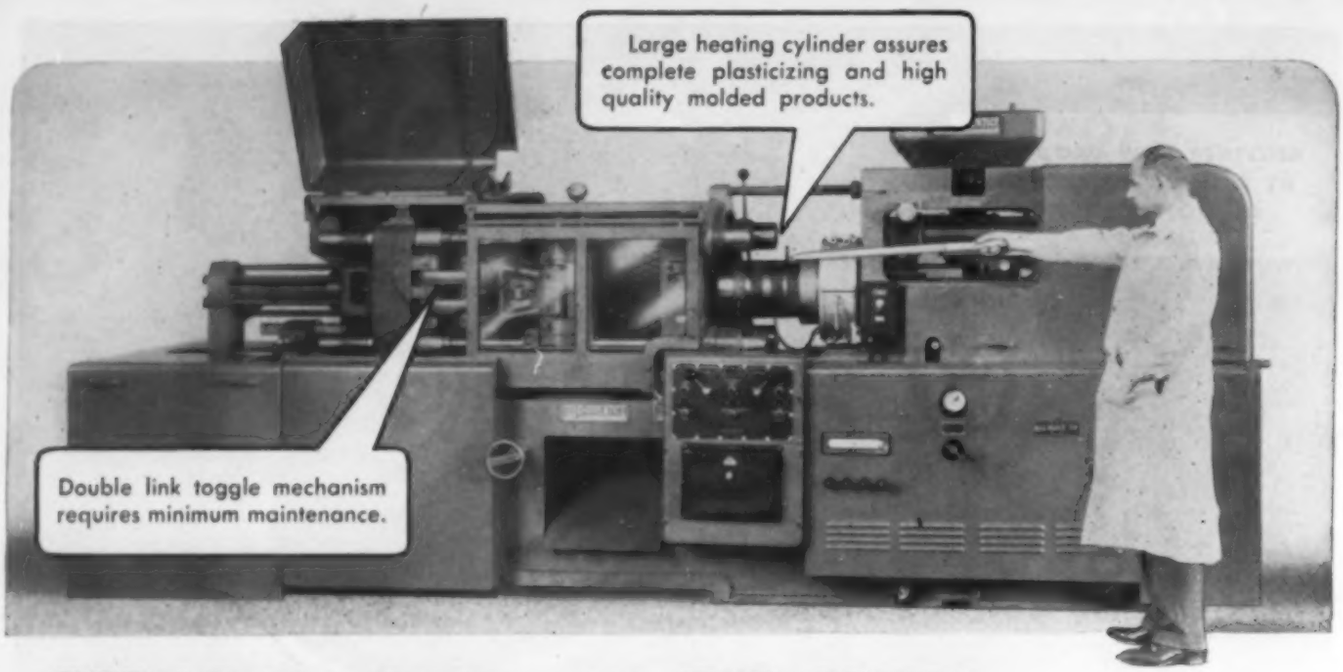
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY


Large heating cylinder assures complete plasticizing and high quality molded products.
Double link toggle mechanism requires minimum maintenance.

INCREASED CAPACITY *at* LOW COST!

The new 10D-12 Oz. Reed-Prentice plastic injection molding machine offers a combination of the outstanding features of the larger 10E-16 Oz. and the popular 10D-8 Oz. models.

The same efficient style of heating cylinder and injection unit of the 16 Oz. machine has been incorporated with the proven 10D-8 Oz. double shear mechanism.

Through the use of these units, already in large production, the 10D-12 Oz. model combines lower machine cost with higher plasticizing capacity. Quick and easy accessibility to all parts for maintenance — characteristic of all Reed-Prentice injection machines—has been retained in this model.

10D-12 Oz. SPECIFICATIONS

Die locking pressure, tons	275
Max. casting area, sq. in.	100
Mold opens	10¼"
Max. die space	16"
Size: die plates	21 x 25"
Pressure psi on material	20,000

For the utmost in economical machine operation and profitable molding production, it will pay you to investigate the new 10D-12 Oz. machine. Write Dept. D for the Reed-Prentice circular "A Complete Service on Injection Molding".

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

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REED-PRENTICE CORP.
WORCESTER MASS., U.S.A.

LOS ANGELES 11
2314 Santa Fe Ave.

Toy automobile molded of Lumarith* plastic by Consolidated Molded Products Corp., Scranton, Pa., for Manoil Manufacturing Company.

LUMARITH* (ACETATE) PLASTIC

1949 MODEL

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Lumarith, in a full range of colors, is priced as low as 35 cents per pound (a special color group including black, 30 cents). With Lumarith you can be certain of giving your products the toughness, serviceability, surface permanence and all around quality they need for selling in today's competitive market. Write or call for color samples and other information.

A Celanese* PLASTIC

Celanese Corporation of America, Plastics Division, Dept. 1-G, 180 Madison Avenue, New York 16, N. Y.

*Reg. U. S. Pat. Off.

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● **Good judgement in the selection of materials is basic to the efficient and economical production of quality moldings. Prolon Plastics takes the "guesswork" out of all phases of molding . . . makes it an *exact science.* And the entire production process is *scientifically controlled* to insure uniformly high quality.**

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better service,
write to

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COMPLETE CUSTOM MOLDING SERVICE
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use PLIOVIC AO

in Organosols

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Pliovic AO organosols are formulated with ease — using conventional compounding ingredients — to produce both clear and colored films — as well as coatings for textiles and papers. For full details and sample write, Goodyear, Chemical Division, Akron 16, Ohio.

USE PROVED *Products*

GOODYEAR

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WESTCHESTER
cellulose acetate molding powders
all colors
all flows
SPECIAL COLORS...DELIVERED FAST AT STANDARD PRICES
SPECIAL FORMULATIONS DEVELOPED FOR SPECIFIC APPLICATIONS
metallized
pearlized
STANDARD LINE OF POWDERS AND UNIFORM SIZE PELLETS IN GRADES FOR INJECTION MOLDING AND EXTRUSION
Producers of the first uniform molding granules, Westchester Plastics has been formulating acetate since 1938. Westchester specializes in custom compounding pearlized material, using either natural or synthetic essence. Important, too, Westchester's low temperature compounding prevents degrading of the molding powders and assures maximum plasticity in your product.
For details and prices, write today
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Saves you 3 to 4 cents per pound on colored extrusions

By purchasing lower priced uncolored vinyl, polyethylene and Geon* resins and coloring them yourself with UNICOLOR, as uniformly as the manufacturer can, you save three to four cents on every pound of material you extrude. UNICOLOR is not an ordinary concentrate. It's a molecularly blended colorant which gives results far superior to the dry coloring method, *without any mess.* For use, UNICOLOR is merely mixed, 1 part to 24, with uncolored resin and fused under the heat and pressure of the extruder cylinder.

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*Reg. Trademark B. F. Goodrich Chem. Co.

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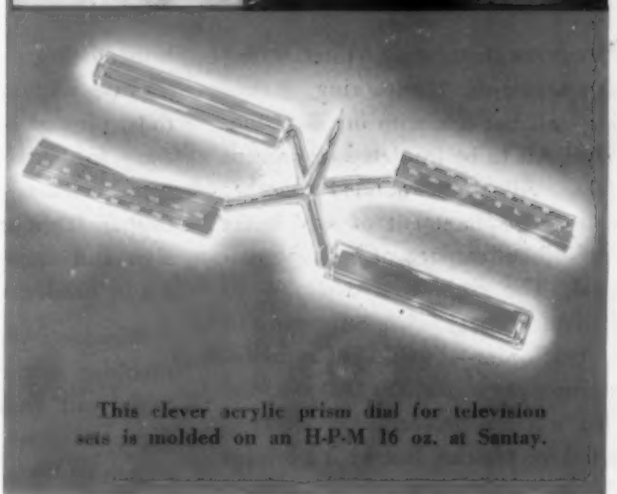
Whether you are a custom molder or one who operates a captive shop, H-P-M injection machines will prove to be real money makers for you. Here's why . . . fast cycle . . . ample capacity . . . dependable H-P-M Hydraulic power equipment. Molders like the H-P-M straight-line hydraulic die clamp. It can't be beat for quick die set-up. It's easy on dies, too. There are no toggles or links to adjust! Different die thicknesses are no problem. Call in a nearby H-P-M Engineer. Write today.

THE HYDRAULIC PRESS MFG. COMPANY
1010 Marion Road, Mount Gilead, Ohio, U. S. A.



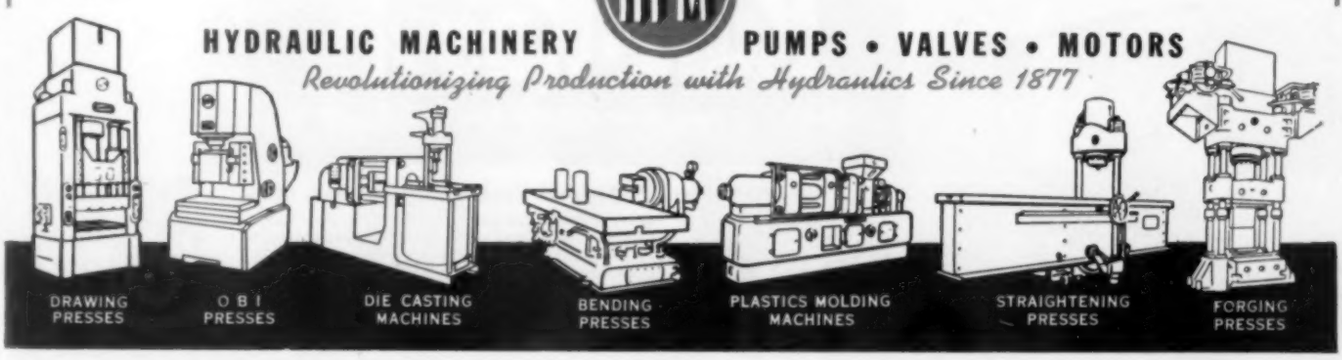
This clever acrylic prism dial for television sets is molded on an H-P-M 16 oz. at Santay.

For all the facts WRITE for a free copy of Bulletin 4802. It tells you what H-P-Ms will do for you.

HPM

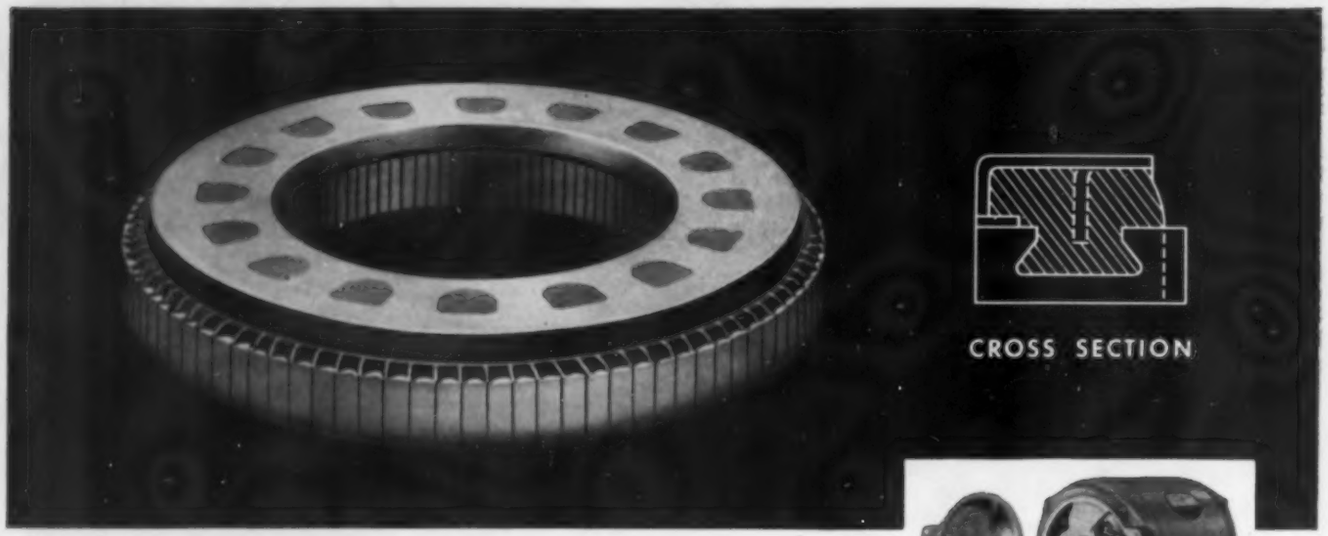
HYDRAULIC MACHINERY **PUMPS • VALVES • MOTORS**

Revolutionizing Production with Hydraulics Since 1877

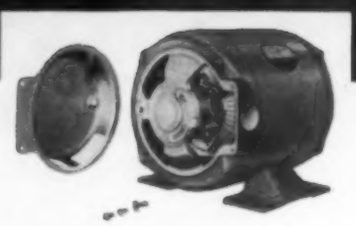


IT'S PLASTICS—OR ELSE

for this B-Line Radial Motor Commutator



Advanced design radial commutator—moulded by Kurz-Kasch.



A great new Brown-Brockmeyer Motor—B-Line brush lifting type.

96 COPPER SEGMENTS, 96 interleaving mica segments, 1 mica ring, 1 steel ring—all but one with intricate contours! All to be insulated to prevent arcing. All to be bonded together without displacement of any insert and without seepage of bonding material. The completed assembly to withstand machining—dipping in molten solder—150 lbs. of centrifugal force per segment at 10,000 RPM! That was the problem. Obviously it called for plastics. But what a job for plastics!

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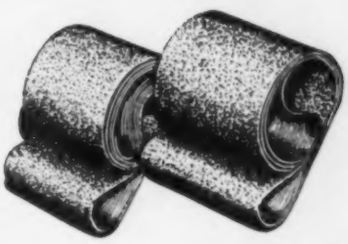
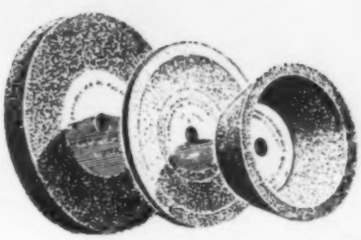
ABRASIVE PRODUCTS





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In the use of phenolic resins for bonded and coated abrasives, it is especially important that successive shipments be uniform. Variations in resins create production problems, raise costs, and lower quality of the finished product.

It is noteworthy that many of the leading manufacturers of bonded and coated abrasives regularly specify VARCUM Phenolic Resins for their products. This broad acceptance of VARCUM Resins is the result of their proved uniform high quality, strength of bond, resistance to heat and abrasion, and wet strength, where required.

Make your own tests on VARCUM Resins . . . we will send you samples on request.

Synthetic VARCUM Resins

VARCUM CHEMICAL Corporation

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take a peek at **profits**...

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The toy furniture you see above was manufactured by Columbia Protektosite for the Plastic Art Toy Corporation of America . . . won the Toy Award in the Modern Plastics 1948 competition . . . and currently is winning some very, very satisfactory sales and profits in retail stores throughout the country.

One of the big reasons why Columbia excels in the manufacture of plastic *merchandise* is that we are merchandisers ourselves—with a long list of successes in creating products for ourselves as well as others.

If you have a problem in plastic products, and want the benefit of a practical, price-conscious, market-wise viewpoint, your inquiry will be welcome.

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COLUMBIA 25TH ANNIVERSARY

VINYLS

MONSANTO PLASTICIZERS

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Low-temperature flexibility.
Flame resistance.
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Low burning rate.
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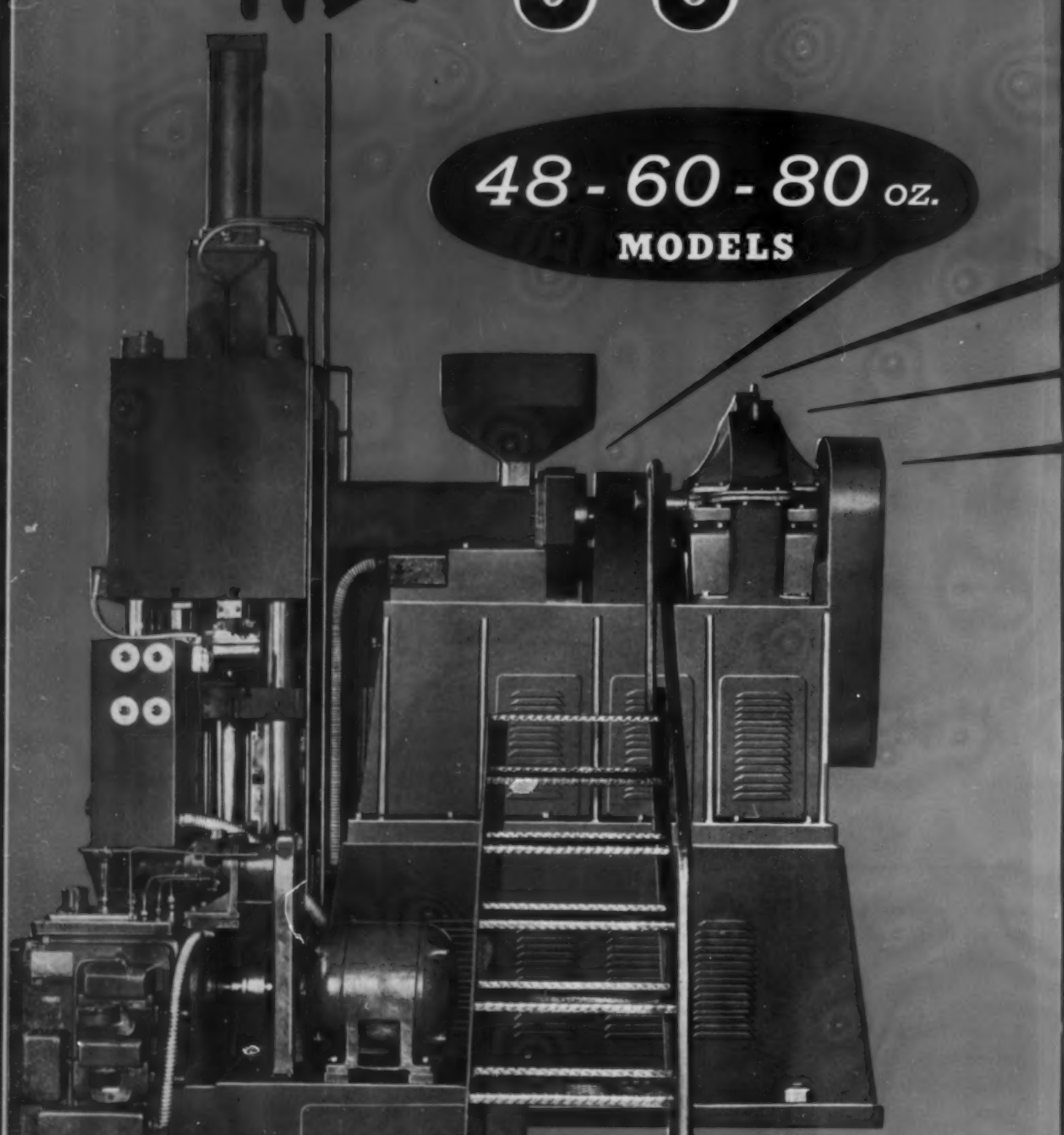

MAKES *SUPER-SIZE* INJECTION MOLDINGS!

LOW OPERATING PRESSURES!

100% PLASTICIZATION!

EXTRA-FAST CYCLES!

Meet the spectacular J-C Press* . . . the all-new machine that mass-produces **extra-large, high quality** moldings at record speeds . . . and at unmatched economy per molded piece. And because it operates at amazingly **lower** pressures than other machines, the J-C Press is light in weight, low in price, small in size and tremendously cheaper to operate and maintain.

Here's the explanation . . . The J-C Press is a complete departure from conventional injection molding machine design. Look at the picture and you'll see that it is actually an extruder (below the hopper) and a vertical, transfer-type press — all in one! *The specially-built extruder does three jobs: 1—it heats, 2—it* ***completely and uniformly*** *plasticizes, and 3—it feeds the molding compound directly into the vertical torpedo-less injection chamber in* ***exact*** *one-shot doses—all automatically.* Due to this complete pre-plasticization, injection pressures are negligible. For example, on a 23-ounce shot of polystyrene we use 3100 psi as against 25,000 psi on a conventional machine. Locking pressures are low (often 300% to 400% less) and only small pumping units are required.

Thanks to this radical new design, the J-C Press operates on an uninterrupted high-speed schedule. Cycle succeeds cycle at rapid-fire tempo with automatic timers controlling each step in the entire press operation — plasticizing, feeding, injecting, clamping, cooling and opening. There's no downtime anywhere along the line.

And thanks to this same sensational design, *the J-C Press can be used not only for injection molding but for compression and transfer molding as well! Even the extruder can be put to separate use on regular extrusion runs!*

*Patents applied for

WRITE NOW FOR COMPLETE INFORMATION

The spectacular J-C Press opens up a new and virtually untapped market for large thermoplastic pieces throughout the industrial world. Act now to insure **your** position in the field by writing today for detailed specifications, prices and delivery dates on the model (48, 60, or 80-ounce) whose capacity fits your needs.

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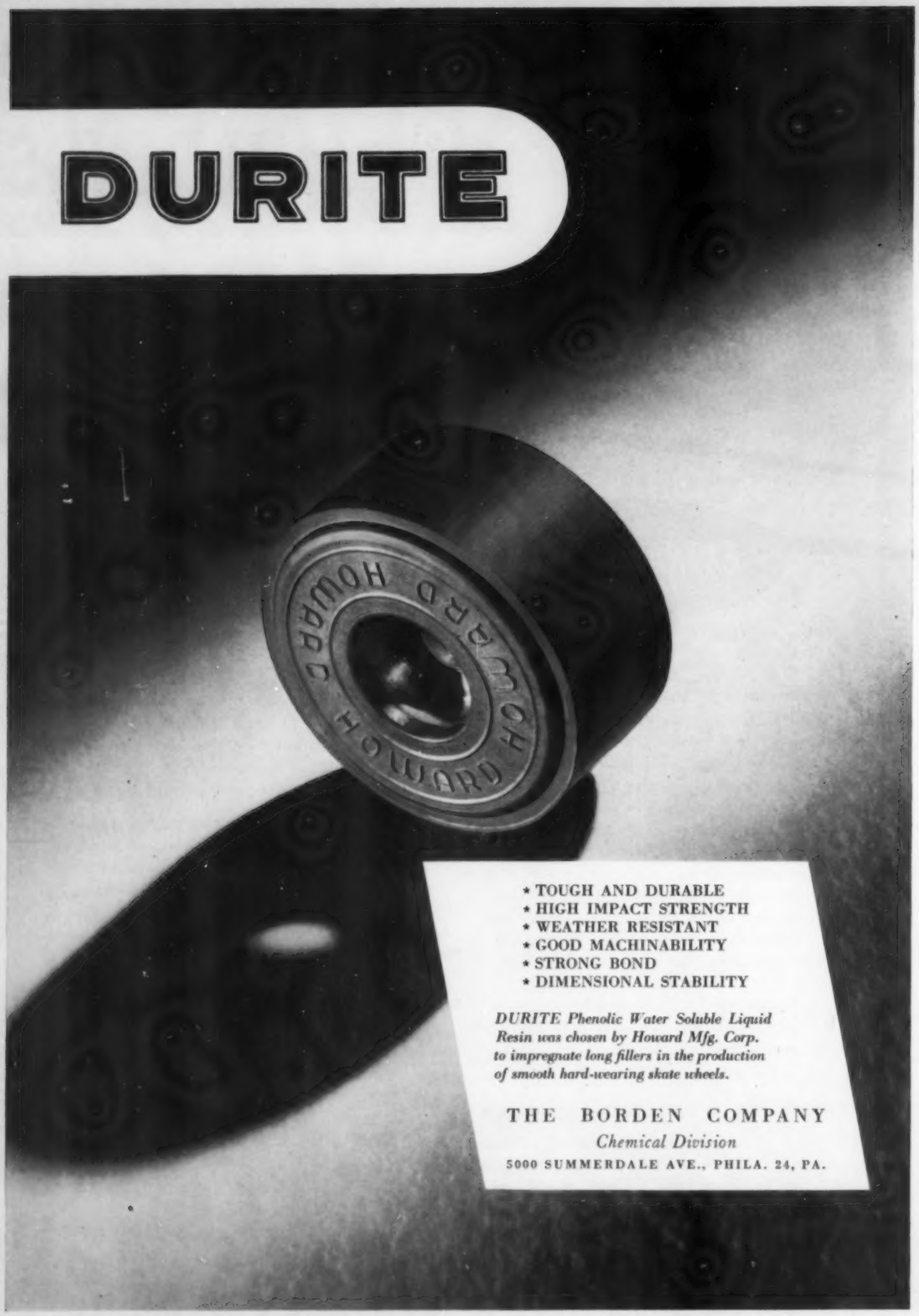
COMPANY

SAGINAW, MICHIGAN

DURITE



* TOUGH AND DURABLE
* HIGH IMPACT STRENGTH
* WEATHER RESISTANT
* GOOD MACHINABILITY
* STRONG BOND
* DIMENSIONAL STABILITY

DURITE Phenolic Water Soluble Liquid Resin was chosen by Howard Mfg. Corp. to impregnate long fillers in the production of smooth hard-wearing skate wheels.

THE BORDEN COMPANY
Chemical Division
5000 SUMMERDALE AVE., PHILA. 24, PA.

Swedlow

PIONEERS IN ACRYLIC

ENGINEERED FABRICATION

An organization of engineers who know the capabilities of acrylics and the most effective techniques in working them.

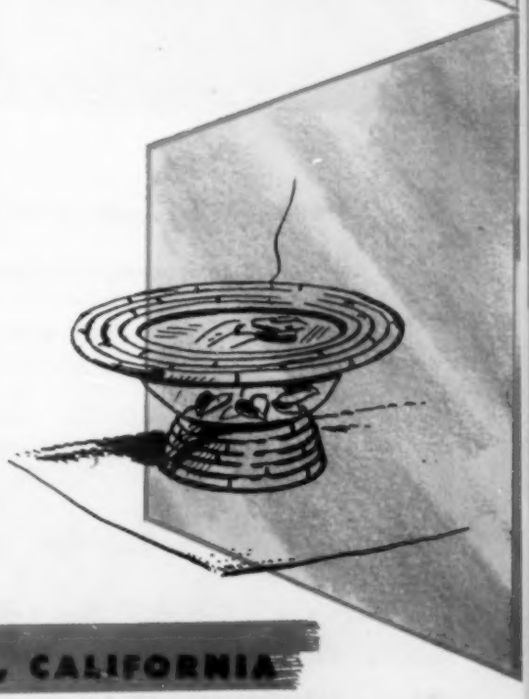
Our modern enlarged plant is equipped for large-scale fabrication of parts, assemblies and sub-assemblies—has the highly specialized facilities needed to form, blow, deep draw, bond and machine materials of the acrylic group. These are only a few of the interesting forms recently developed using SWEDLOW "ingenuity in acrylics":

From the "blisters" of the historic B-29's to every form of acrylic aircraft parts as large as sixty square feet—astrodomes, noses, windows and canopies with perfect optical properties.

Lighter, more striking signs that take advantage of the light-conducting property of acrylic materials to double their display value and attractiveness.

Smart, ultra-modern furniture adapted from bomber "blisters." If you have any ingenious ideas for the use of acrylic material, we will work with you to develop them for practical production.

17 years' experience as leaders and pioneers in plastic manufacturing and acrylic fabrication qualifies SWEDLOW to render valuable aid in practical applications of these materials.



Swedlow PLASTICS CO.

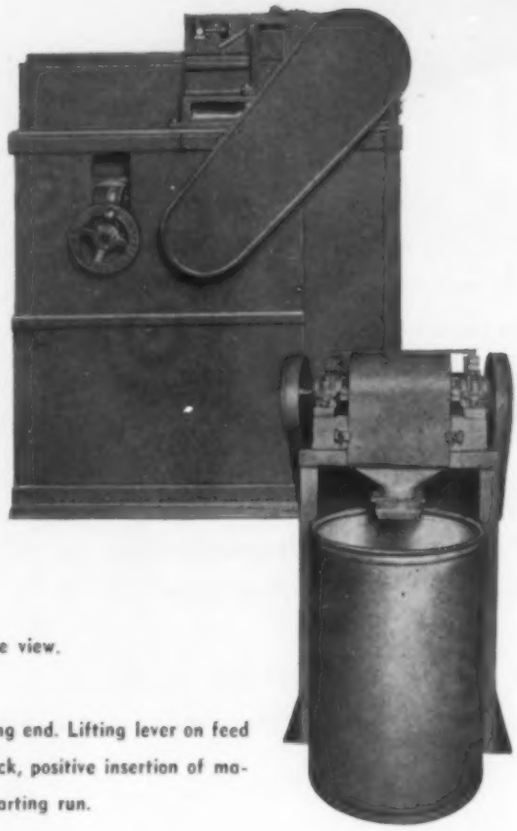
757 WILSHIRE BOULEVARD • LOS ANGELES 5, CALIFORNIA

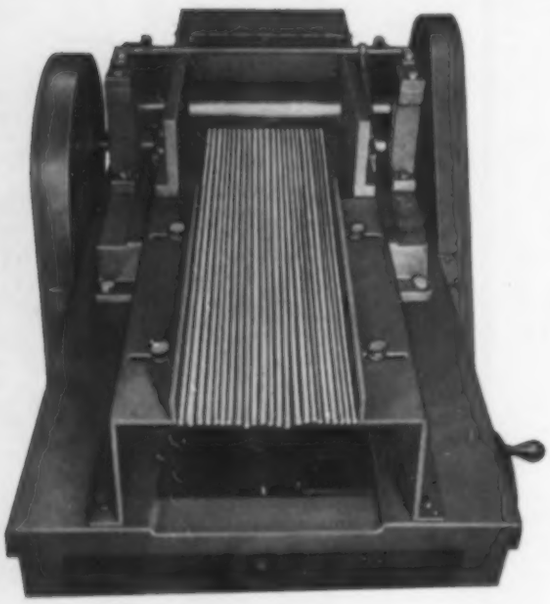
SOLE FOREIGN DISTRIBUTORS: OMNI PRODUCTS CORP.
460 FOURTH AVE., N. Y. 16, N. Y.

NEW! IMPROVED DICER

features variable extrusion speed feed control and lower power consumption!

- 10 to 50 ft. per min. speeds by turning variable speed control handle, without changing sprockets.
- 1/8" cube cut on standard dicer; simple sprocket change adjusts pellet sizes up to 5/16".
- 9½" max. feed width on standard dicer.
- 1½ H. P. motor meets max. power requirements because stationary bed knife is set at shear cut, reducing power consumption.





ABOVE: Control side view.

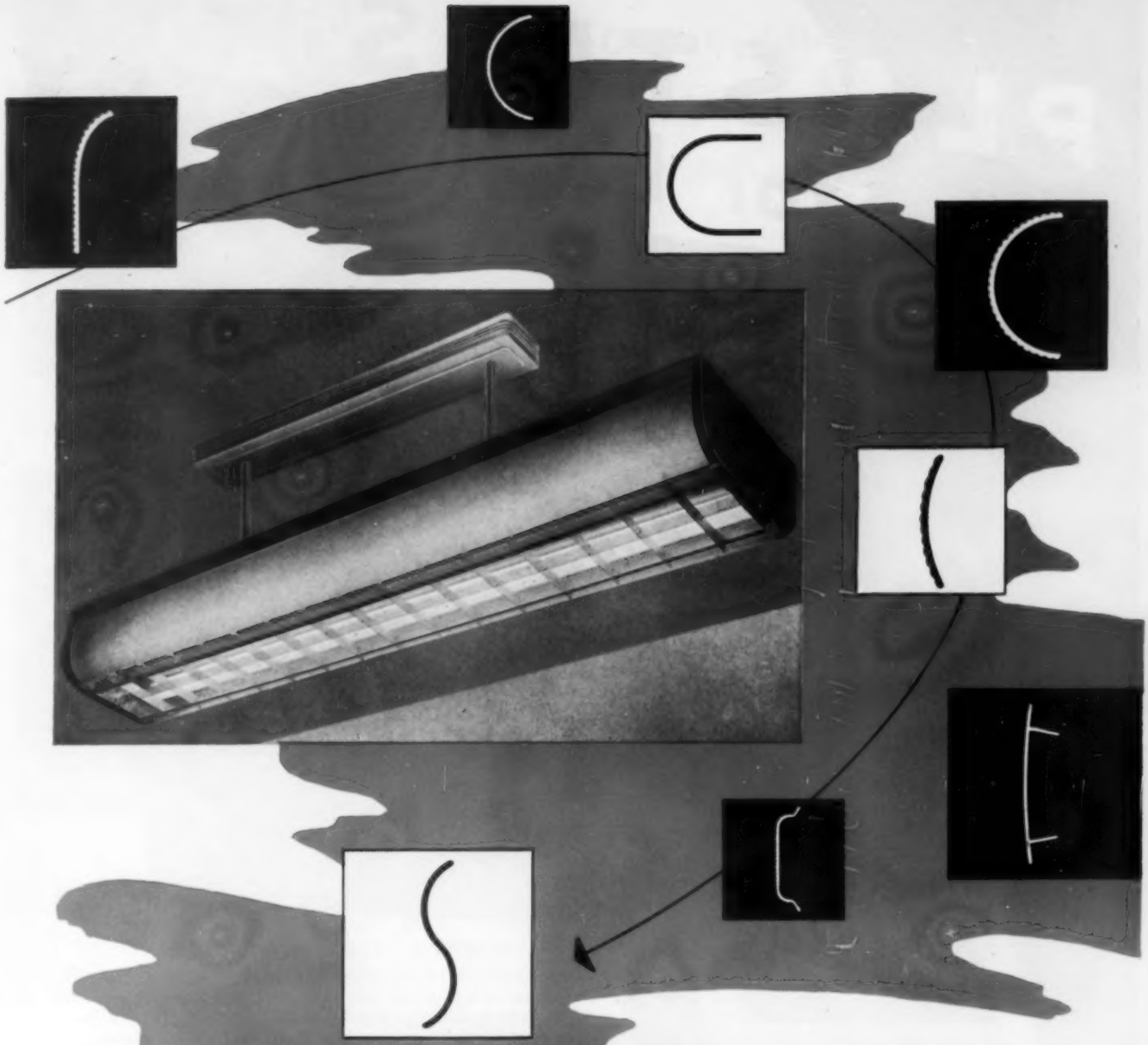
LEFT: View of feeding end. Lifting lever on feed roll allows quick, positive insertion of material when starting run.

RIGHT: Discharge end. Note waste-preventive shut-off gate on chute, also chute flange connection which provides for stocking attachment if desired.

Here it is! — the B & J Pellet-Dicer — for manufacturers of thermoplastic materials, vinylite or similar compounds. Attachment available, as accessory to standard machine, for slitting continuous sheets, cubing them in same operation. Write for full-detailed folder and list of representatives.

BALL & JEWELL, INC.

22-28 FRANKLIN ST., BROOKLYN, N. Y.



EXTRUDED PLASTIC PANELS
for Lighting Fixtures

Shown are some of the stock shapes we have available for immediate delivery. We produce them in clear material as well as in various degrees of opacity formulated to your specification.

If you have special requirements, Yardley engineers will design flat or profile sections up to 10" in width.

Yardley extruded plastic panels eliminate breakage troubles, provide more even light diffusion, offer greater versatility in design. Investigate.

There's an experienced Yardley representative near you.

YARDLEY PLASTICS CO.

142 PARSONS AVE. • ADams 9315 • COLUMBUS 15, OHIO

PLASTICS for INDUSTRY

CREATIVE CUSTOM MOLDING

Illustrated above is a Methyl Methacrylate advertising sign made for Price Brothers, Inc., display and sign Mfgrs. of Chicago for the Jos. Schlitz Brewing Company of Milwaukee, Wis.

The deep lettering in the word "Schlitz" (measuring 5/16" deep) is filled with a translucent cream color; the center panel is dark brown in color. The copy of the lower part of the sign is silk screened in red color. A specially developed lacquer is applied around the border to simulate a sand blasted finish. Over a pound of material is required for the plastic casting.

Cruver's engineers collaborated with the customer in the development of this distinctive sign.

CRUVER CHICAGO

52nd Year in Plastics . .

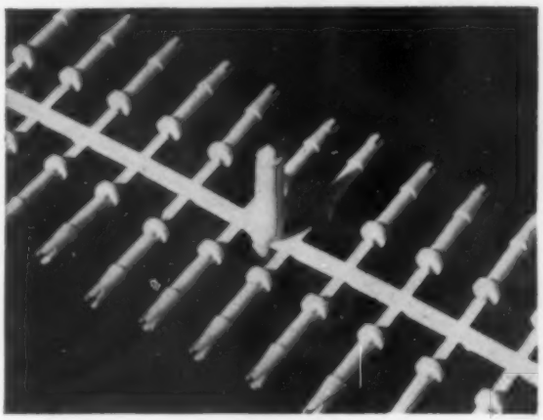
Cruver

MANUFACTURING COMPANY

2456 W. Jackson Blvd., Chicago, Ill., Seeley 1300

New York – 2 W. 46th St. • Wisconsin 7-8847

Reddi-wip-whipped cream dispenser with plastic valve stem and cap molded of Koppers Polystyrene 7. The valve stem is molded with a very small gate—almost a pin point.



200,000 Reddi-wip parts a day

made on a 20-second molding cycle with

Koppers Polystyrene

Valve assembly made by The Robinson Company for Reddi-wip, Inc., St. Louis. Plastic parts molded by Detroit Plastic Engineering.

● Women get a "bang" out of using this clever whipped cream dispenser. All they do is shake it up, press the plastic valve and out comes the whipped cream. There is no tiresome whipping . . . no dishes to wash . . . and no waste of whipped cream. What's left can be used some other day.

Sales of Reddi-wip cream have been tremendous. Six million of these cap assemblies have already been made. More are being produced by Detroit Plastic Engineering at a rate of 200,000 per day. The 20-second molding cycle obtained with Koppers Polystyrene 7 makes this high production possible. The molder is well pleased with this fast-flowing, fast-setting material and he gets a high percentage of perfect parts.

Other factors leading to the selection of Koppers Polystyrene were its freedom from taste and odor, unlimited choice of color and low cost. What's more, this same valve assembly can also be used for such things as ketchup, mustard, and other items.

If you want to speed up production, cut costs and make a better product, use Koppers Perfected Plastics.

KOPPERS COMPANY, INC.
Chemical Division Pittsburgh 19, Pa.
Regional offices in New York, Boston, Chicago and San Francisco

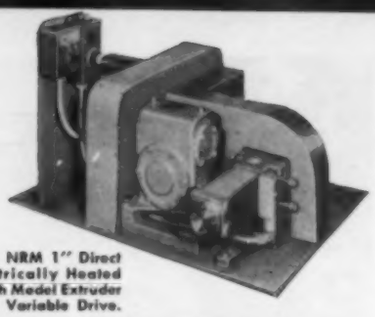
KOPPERS

Koppers Perfected Plastics

Koppers Company, Inc.
Chemical Division, Dept. MP 7
Pittsburgh 19, Pa.
Please send me your booklet on Koppers Perfected Plastics.
Name_____
Company_____
Address_____
City_____ State_____

*POLYSTYRENE *ETHYL CELLULOSE *CELLULOSE ACETATE

ARE YOU EXTRUDING HIGH TEMPERATURE PLASTICS COMPOUNDS?



NRM 1" Direct Electrically Heated Bench Model Extruder with Variable Drive.

NRM 1½" Direct Electrically Heated Extruder.

Proven designs and features developed during *10 years* of engineering and laboratory tests devoted exclusively to the plastics *extrusion* industry are reflected in NRM Standard Line of Direct Electrically Heated Extruders.

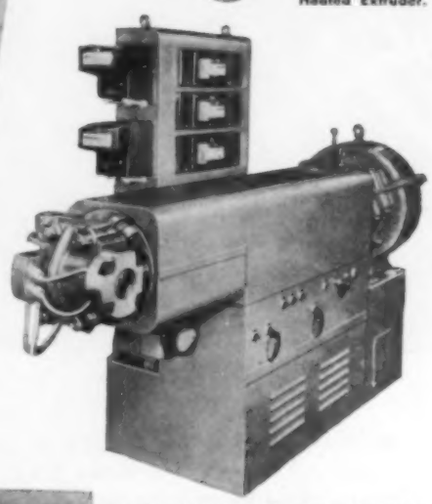
Look at these outstanding and important features.

- Simplicity in operation.
- *Only three* controlled heating zones to adjust at the cylinder.
- *Absolute control over frictional heat.*
- Standard temperature range up to 750°F.
- *High capacity precision extrusions* resulting from adequate screw and cylinder length.
- Torpedo type or full flighted screws.
- Heavy duty gear transmissions with oversize thrust bearing.
- 6" — 8" — 10" — 12" Direct Electrically Heated Extruders are also available.

To cut production costs in plastics processing, write for your *free* copy of the new NRM Plastics Extrusion Equipment Catalog.

NRM

...the oldest name in Plastics Extrusion Equipment



NRM 3½" Direct Electrically Heated Extruder with Electrically Heated Crosshead.

NRM 4½" Direct Electrically Heated Extruder.

NRM 2½" Direct Electrically Heated Extruder.

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 8, OHIO

Plastics
MACHINERY DIVISION

EXPORT DISTRIBUTORS: OMNI PRODUCTS CORPORATION, 460 FOURTH AVE., NEW YORK 16, N. Y.

Tests show Marvinol® saves time... improves quality in making plastics

In laboratory tests and production runs, Marvinol vinyl resins are proved time-savers due to shorter pre-mix, open mill and Banbury cycles . . . faster extrusion cycles.

IN ADDITION TO TIME-SAVINGS in processing, Marvinol offers many important benefits to processors, fabricators, marketers and consumers. Products based on Marvinol vinyl resins have greater flexibility at low temperatures . . . less deformation due to heat. They're extra tough, dry and pleasant to touch. They resist oils, acids, wear, tear and abrasion.

High processability spreads these benefits to many varied fields, for Marvinol can be calendered, extruded, injection-molded or dispersed for coating and slush molding . . . in rigid, semi-rigid or elastomeric formulations . . . Test this remarkable vinyl polymer. Chances are, if you're a processor, it will pay you in time-savings and quality . . . and if you make end products it will increase the salability of your merchandise.

Send for details about Marvinol. While The Glenn L. Martin Company does not compound or fabricate in the plastics field, we do sell raw materials to processors and will be glad to refer you to one of our customers if you're interested in Marvinol. Write to Chemicals Division, Dept. M-7, THE GLENN L. MARTIN COMPANY, BALTIMORE 3, MARYLAND.

Marvinol's extra toughness and dryness make plastics products more durable with a surface that's pleasant to touch.

• • •

Marvinol's greater flexibility in low temperatures pays off in products subjected to severe exposure and cold weather during shipping or use.

• • •

Superior dimensional stability makes Marvinol vinyl resin an ideal raw material for products that must not shrink or deform under heat and time.

Martin® Marvinol

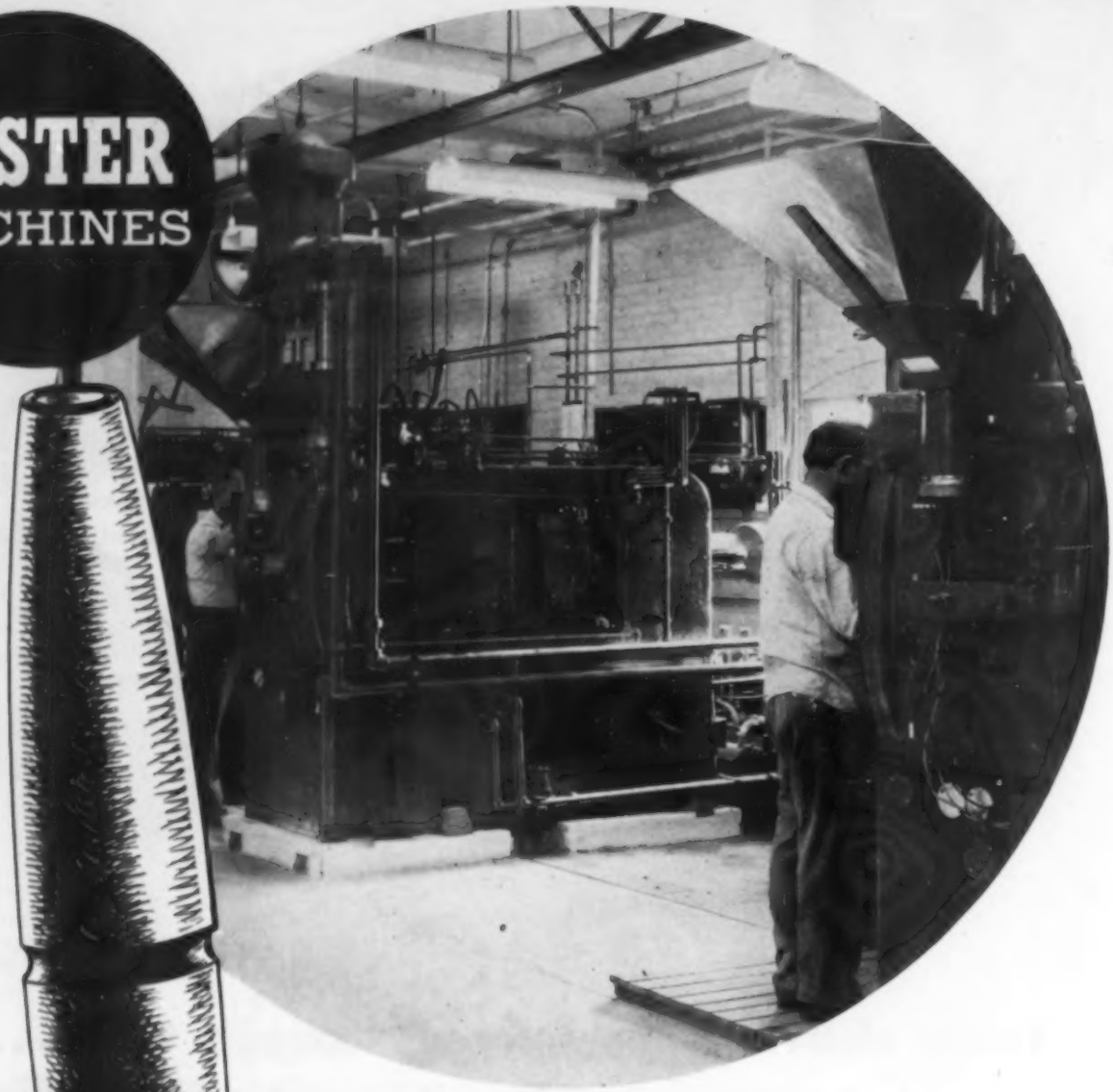
RESINS, PLASTICIZERS AND STABILIZERS PRODUCED BY THE CHEMICALS DIVISION OF

THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION

"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

MANUFACTURERS OF: Dependable Martin 2-0-2 airliners • Advanced military aircraft • Revolutionary rockets and missiles • Electronic fire control systems • Versatile Marvinol resins (Martin Chemicals Division) • **DEVELOPERS OF:** Mareng fuel tanks (licensed to U. S. Rubber Co.) • Stratovision aerial rebroadcasting (in conjunction with Westinghouse Electric Corp.) • Honeycomb construction material (licensed to U. S. Plywood Corp.) • New type hydraulic automotive and aircraft brake • Permanent fabric flameproofing • **LEADERS IN RESEARCH** to guard the peace, build better living in far-reaching fields.

LESTER MACHINES



KNOCK DOWN REJECTS

Top flight bowlers know that the score depends on picking up those spares. Likewise, successful molders know that extra profits depend on keeping up a steady rate of production. That's especially important in molding a big piece like the **candle-type bowling pin** shown here. You can't afford many rejects when you're injecting 16 ounces of ethyl cellulose over a wooden core in a one cavity mold. Crown Plastics Corp., of Leominster, Mass., molding these pins for King Pin Plastic Surfacing Co., depends on Lester machines to do the job for them. It's the extra features, such as the internally heated cylinder, the solid frame and the toggle link mold locking mechanism that maintain a constant rate of production with a minimum of rejects. Yes, you can depend on Lester Injection Molding Machines to do the BEST job for you.

Write for your free copy of the Lester Press

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

REPRESENTATIVES

New York . . . . . Steven F. Krould
Chicago . Elmer C. Maywald & Co., Inc.
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Cincinnati . . . Index Machinery Corp.
Milwaukee . . Marquette Engineering Co.
Los Angeles . .Seaboard Machinery Co.
New England . . . Kavanagh Sales, Inc.
Cleveland . . . . . Don W. Williams
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Philadelphia . .Wright & Gade Tool Co.

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London, England . . Dowding & Doll, Ltd.
Calcutta, India . Francis Klein & Co., Ltd.
Sydney, Australia . .Scott & Holladay, Ltd.
Japan, New York . . W. M. Howitt, Inc.

depend on G-E molding compounds

MOLDED FOR A SILVER LINING

All set for pieces of eight, this silver chest is molded from General Electric phenolic powder #12412 by Plastics Molders, Inc., for the Marshall-White Company of Chicago. The molder selected the General Electric material because of its beauty when molded, its consistent molding performance, good flow in the mold, and uniform preheating. General Electric molding compounds are designed to help you get more uniform results in your molding operations, reduce rejects, and lower production costs.

Avail yourself of these services now. Just write to Section 38-7, Chemical Department, General Electric Company, Pittsfield, Mass.

GENERAL ELECTRIC

CD49-54

GENERAL ELECTRIC SUPPLIES 5 DISTINCT MATERIAL SERVICES

Quality Control. General Electric molding compounds have uniform behavior in the mold. Batch to batch consistency is maintained through 65 to 140 tests or controls on each batch during its manufacture.

Application Engineering. General Electric sales representatives, technical service engineers, and chemists will help you select the right phenolic compound for every plastics application.

Technical Service. General Electric technical service engineers, thoroughly experienced with all molding techniques, will help you solve your molding problems, pay you periodic check-up visits.

Materials Development. General Electric's new shock-resistant, Hycar*-phenolic compounds as well as its new fast-curing and low-cost general purpose compounds are typical of the new molding compounds which G. E. is continually developing to help molders increase production and reduce costs.

**Hycar American Rubber; registered trade name, B. F. Goodrich Chemical Company*

Dependable Source of Supply. General Electric provides you not only with high quality ingredients in phenolic molding materials, but also a continuing supply. G. E. performs all stages of manufacturing from the making of phenol itself to the blended powders.

HOT PLATE METAL FORMING MOLDING PRESSES

Bethlehem

is equipped to build the type and size you want

When you are planning to add new hydraulic presses, we suggest that you talk over your needs with us. You will find that we have much to offer in this field.

Bethlehem is well set up to build presses to your specifications . . . in hot-plate, molding, or metal-forming types, and in a wide range of sizes. These can be furnished with or without self-contained or separate hydraulic power systems. If you would like the services of Bethlehem engineers in the planning stages, this technical assistance is readily available.

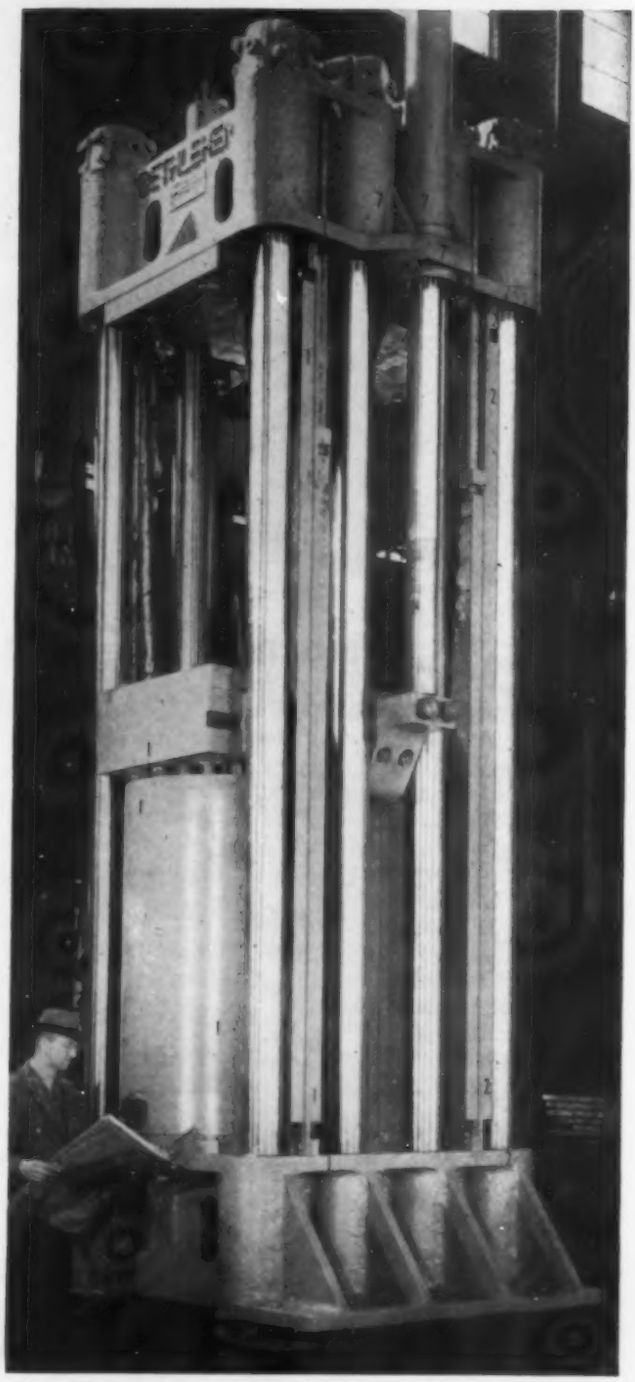
Bethlehem presses are used in the making of plastics, wallboard, fiber board, etc.; and in such services as vulcanizing and the manufacture of metal products. Call us for details; your inquiries will receive careful attention.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM
Custom-Built
HYDRAULIC PRESSES



A medium-sized (2670-ton) Bethlehem molding press.

WINNERS HAVE WHAT IT TAKES

Like a successful fighter, a Nixon Cellulosic Plastic has what it takes... Endurance, Flexibility, Color and a lot of other good qualities. It is practical to use Nixon Cellulosic Plastics... economical too. Consider one of them for your next fabricating or molding job. Nixon C/N (Cellulose Nitrate) is available in Sheets, Rods, and Tubes. Nixon C/A (Cellulose Acetate) and Nixon E/C (Ethyl Cellulose) are available in Molding Powders, Sheets, Rods, and Tubes.

LIKE **NIXON PLASTICS**

NIXON NITRATION WORKS • NIXON • NEW JERSEY

Representatives in Principal Cities • *Chicago Office:* 510 N. Dearborn Street, Chicago 10, Illinois
Canadian Distributors: CRYSTAL GLASS AND PLASTICS, LTD., Toronto, Can. • *Export Distributors:* OMNI PRODUCTS CORP., 460 4th Ave., N.Y. 16, N.Y.

Now you can consider Polyethylene film and sheeting with confidence

...there is TUPPER Poly-T continuous film and sheeting 96 inches wide — 1½ mils up in thickness.

This new TUPPER product accepts and discharges the obligations to its users which properly attach to all things made under the code of standards of Leadership.

More things can be done with it; more economical use of it enjoyed than has been possible to contemplate by those casting a calculating eye on Polyethylene film and sheeting for the multiplicity of uses for which it would be so much better than anything else, once it could be confidently relied upon.

And now that confidence is assured. For this is the name of the originator of Tupperware and other products bought so eagerly and used so satisfactorily by housewives from Sitka way down to the "Glades"; across the seas in Holland, Belgium, England, France . . . all over the world.

They all know the name and so, products manufactured from Poly-T film and sheeting by TUPPER, and so identified, such as tubes, bags, drapes, curtains; the largest sizes of bed spreads, table cloths, slip covers . . . for packaging, industrial and scientific applications, are bought because—"Oh yes, that's Tupper".

The supply of Tupper Poly-T continuous film and sheeting, 96 inches wide—1½ mils and up in thickness will be somewhat limited for a time, only because of a shortage of raw material. For this reason it seems to be the thing to do, to recommend that correspondence be started at once, that you may not be disappointed in acquiring your needs.

In drapes, folds and puffs, the satiny sheen of Tupper Poly-T film and sheeting is fascinating. Transparent at close range — softly translucent at short distances. Odorless, tough, pleasant to the touch. Flexible to exceedingly low temperatures such as minus 70 degrees Fahrenheit, Tupper Poly-T film and sheeting is richly endowed with all the attributes you have so long desired.

TUPPER

TUPPER!

TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas **New York Show Rooms 225 Fifth Ave.**

ADDRESS ALL COMMUNICATIONS TO: Department D

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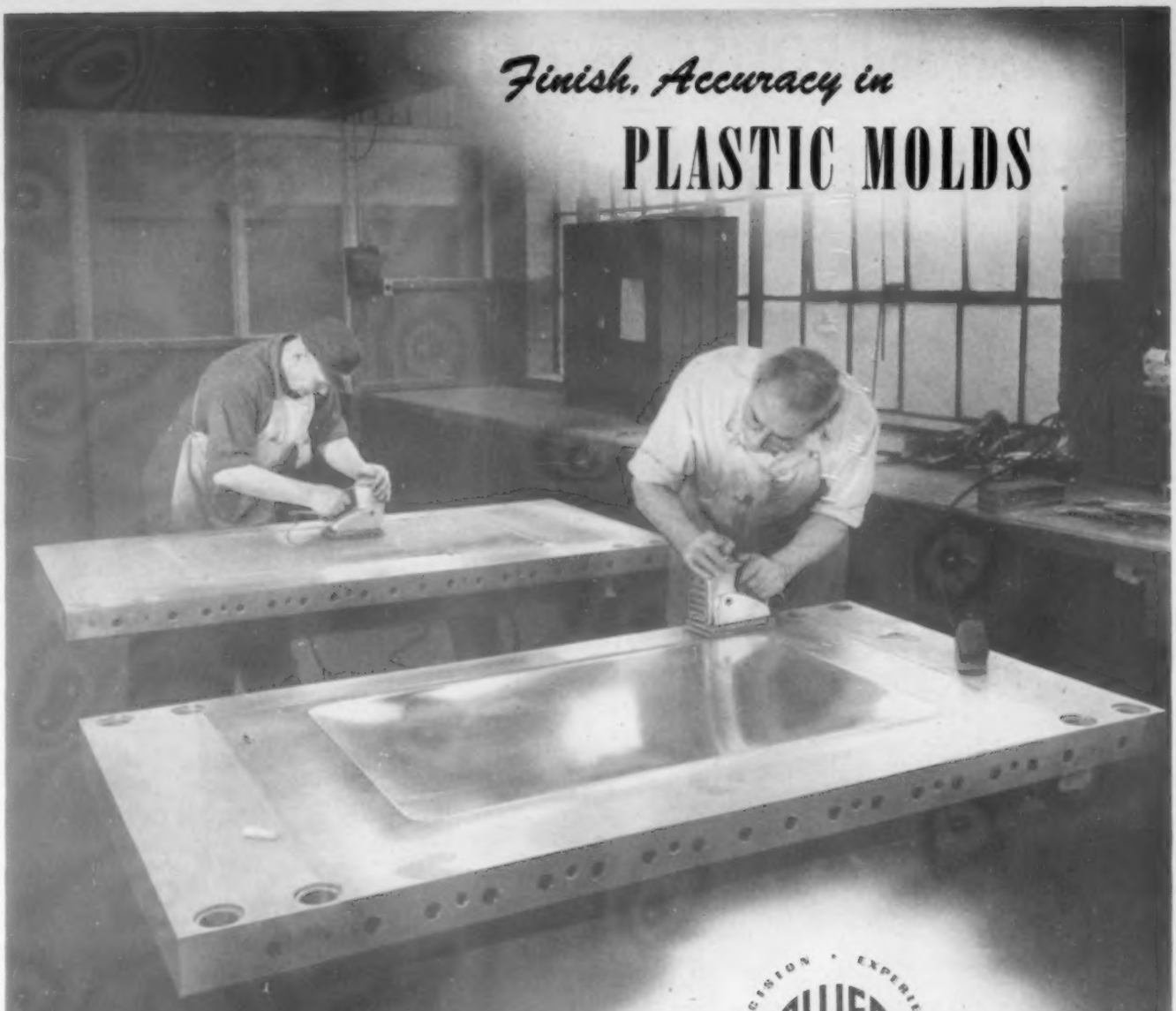
Finish, Accuracy in

PLASTIC MOLDS



ALLIED CORPORATION PRODUCTS
PRECISION · EXPERIENCE · DEPENDABILITY

The facilities and abilities at Allied's Richard Brothers Division for producing steam-heated plastic molds were developed with the plastics industry—are in step with the requirements of this industry today. Whether your demands for molds are "run-of-mine" or unusual . . . whether you require ordinary or 1000 grit finishes . . . whether you are looking for accuracy of form and fit that may be to the highest possible degree of mold-making precision . . . Allied can and will meet your specifications exactly. We will be glad to submit quotations to you.

ALLIED PRODUCTS CORPORATION
Richard Brothers Division
DEPARTMENT 3-P
4622 LAWTON AVENUE • DETROIT 8, MICHIGAN

HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC
MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

DEFLASH and POLISH your CIRCULAR MOLDINGS FASTER, BETTER than ever before...AUTOMATICALLY

on the NASH-116 ROTARY EDGER

That's right! . . . The Nash-116 Rotary Edger allows you to say goodbye to expensive, unsightly abrasive wheel and hand removal of flash from circular molded pieces. Its operation is confined to a minimum line, maintaining the surface appearance of the moldings. Automatically, the flash is removed and flash scars are polished so perfectly that they become all but imperceptible.

HOW THE ROTARY EDGER OPERATES

Four high-speed abrasive belts plus a buffing wheel do the work. They are mounted around a turntable containing six sets of spindles. Moldings placed on the spindles rotate and, as the turntable slowly revolves, are brought into contact with each abrasive belt in turn. The belts have progressively finer abrasives. The last belt is wax-impregnated to blend the flash scars, and the buffing wheel imparts a final polish.

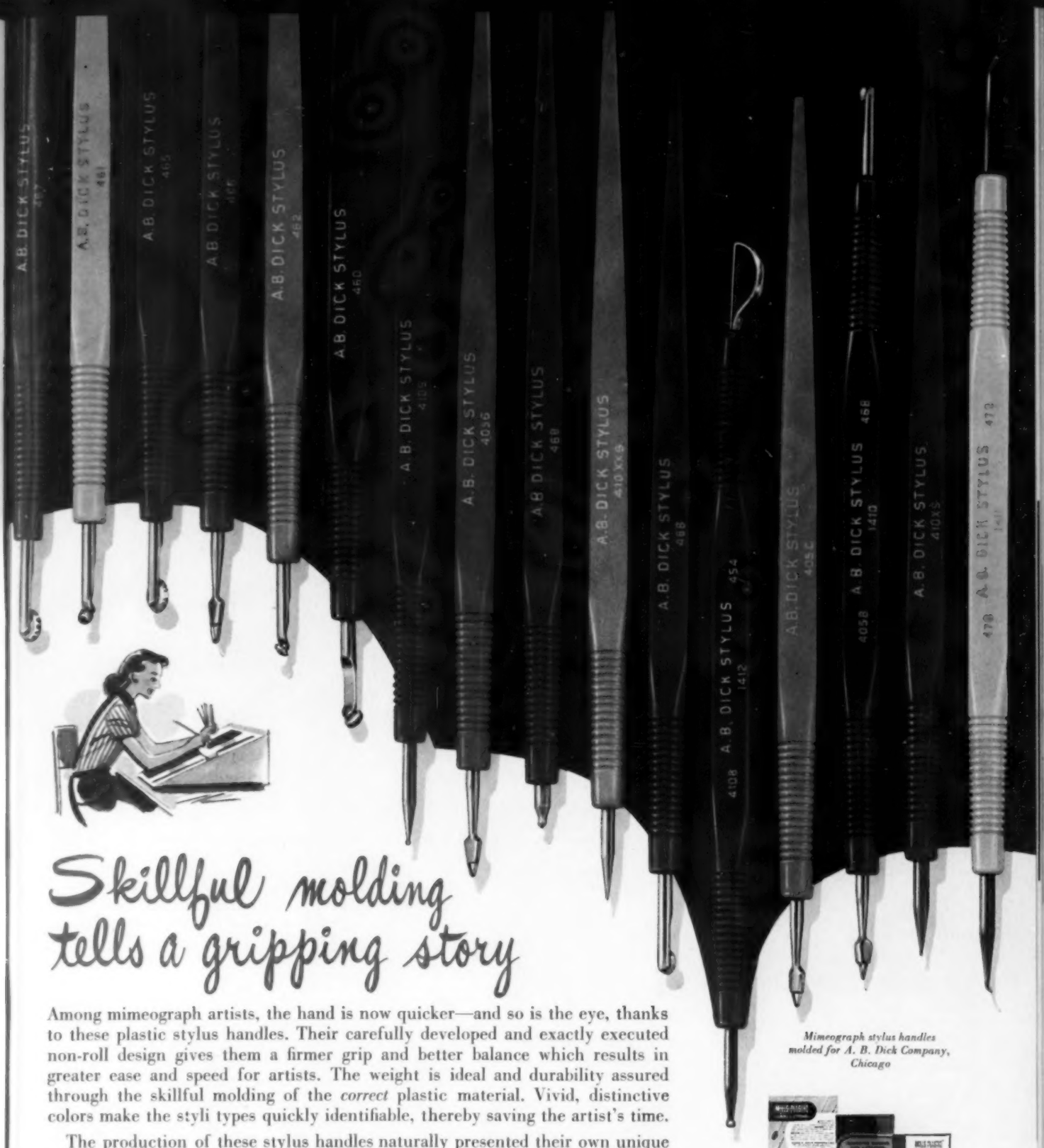
Hand fed, the Nash-116 Rotary Edger perfectly finishes 8 to 24 pieces per minute. It handles plastic dinnerware and other circular moldings from 3" to 11" in diameter. The proper combination of spindle speed and turntable speed (both easily adjustable) is determined by the amount of flash removal desired. The position at which you set the universally mounted abrasive belts permits accurate control of the finished diameter.

The Nash-116 Rotary Edger is easy to use. By speeding and standardizing your flash removal, buffing and polishing, it enables you to produce more uniform, better finished pieces at considerably less than usual per-unit cost. Aside from the consideration of improved product appearance, the Nash-116 Rotary Edger should save you enough in reduced labor overhead to be written off in a remarkably short while.

Your inquiry will receive prompt attention. Write to us for engineering details and price data without delay.

J. M. NASH COMPANY

2360 NORTH 30th STREET • MILWAUKEE 10, WISCONSIN



Skillful molding tells a gripping story

Among mimeograph artists, the hand is now quicker—and so is the eye, thanks to these plastic stylus handles. Their carefully developed and exactly executed non-roll design gives them a firmer grip and better balance which results in greater ease and speed for artists. The weight is ideal and durability assured through the skillful molding of the *correct* plastic material. Vivid, distinctive colors make the styli types quickly identifiable, thereby saving the artist's time.

The production of these stylus handles naturally presented their own unique engineering and molding problems. But the end results: better performance, smarter appearance, more sales appeal are typical of all Mills plastic products, created in America's finest, most modern molding plant.

One of our representatives will gladly show you how to make sure your plastic products have these important extra values. Tell us today when he may call.

Mimeograph stylus handles molded for A. B. Dick Company, Chicago

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about [redacted], piping, tubing and fittings, write for circulars containing data and illustrations. *Trademark registered*

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Lucite, Nylon, Ethyl Cellulose, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, [redacted]*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

NEW ADDRESS

NEW PLANT

What next in plastics? Successful production of this giant size molding pushes back the horizon. The Admiral Television cabinet weighs about twice as much as the largest casting heretofore compression molded. It suggests many new applications for plastic housings, with their sleek contours, colorful beauty and economical cost.

MPc was ably qualified by past experience to take on this pioneering job for Admiral. Having previously produced large radio-phonograph and table television cabinets, **MPc** had acquired useful working knowledge of the problems involved. The immense molds were designed and machined in the **MPc** tool room. **MPc** manufacturing sagacity readily coped with the unprecedented material bulk, the heavy sections and the enormously deep "draw."

Whether your plastics production involves unusual size, close tolerances or other unusual factors, come to **MPc**. Send your sample or blueprint to MOLDED PRODUCTS CORPORATION, 4535 W. Harrison St., Chicago 24, Ill.

PLASTICS DIVISION
MOLDED MPc PRODUCTS
CORPORATION

biggest

Television consolette tooled and produced by **MPc** for Admiral Corporation.

SIZE: 32¼" high, 16¾" wide, 18" deep
WEIGHT: 35 pounds

Compression molded in one piece, including the center shelf which supports the television chassis. The power supply rests on the bottom of the cabinet. The speaker grill is integrally molded. Openings for the television window and four control shafts are cored in. Internal ribbing serves a double purpose . . . adds strength and provides cored studs for mounting various components with self-tapping screws. Electronic pre-heating of the molding material and automatically actuated side cores shorten the molding cycle.

THE MOLDS

In the **MPc** tool room, huge blocks of tool steel, weighing a total of 16,000 pounds, were machined to make these immense molds. Their gem-like precision and finish are a product of the most advanced equipment, skillfully operated by **MPc** mold-makers. With characteristic resourcefulness, **MPc** engineers designed side-cores to operate automatically between the two plunger sections. These side-cores provide molded-in mounting holes in the center shelf . . . save the time and expense of drilling this hard-to-reach section.

THE PRESS

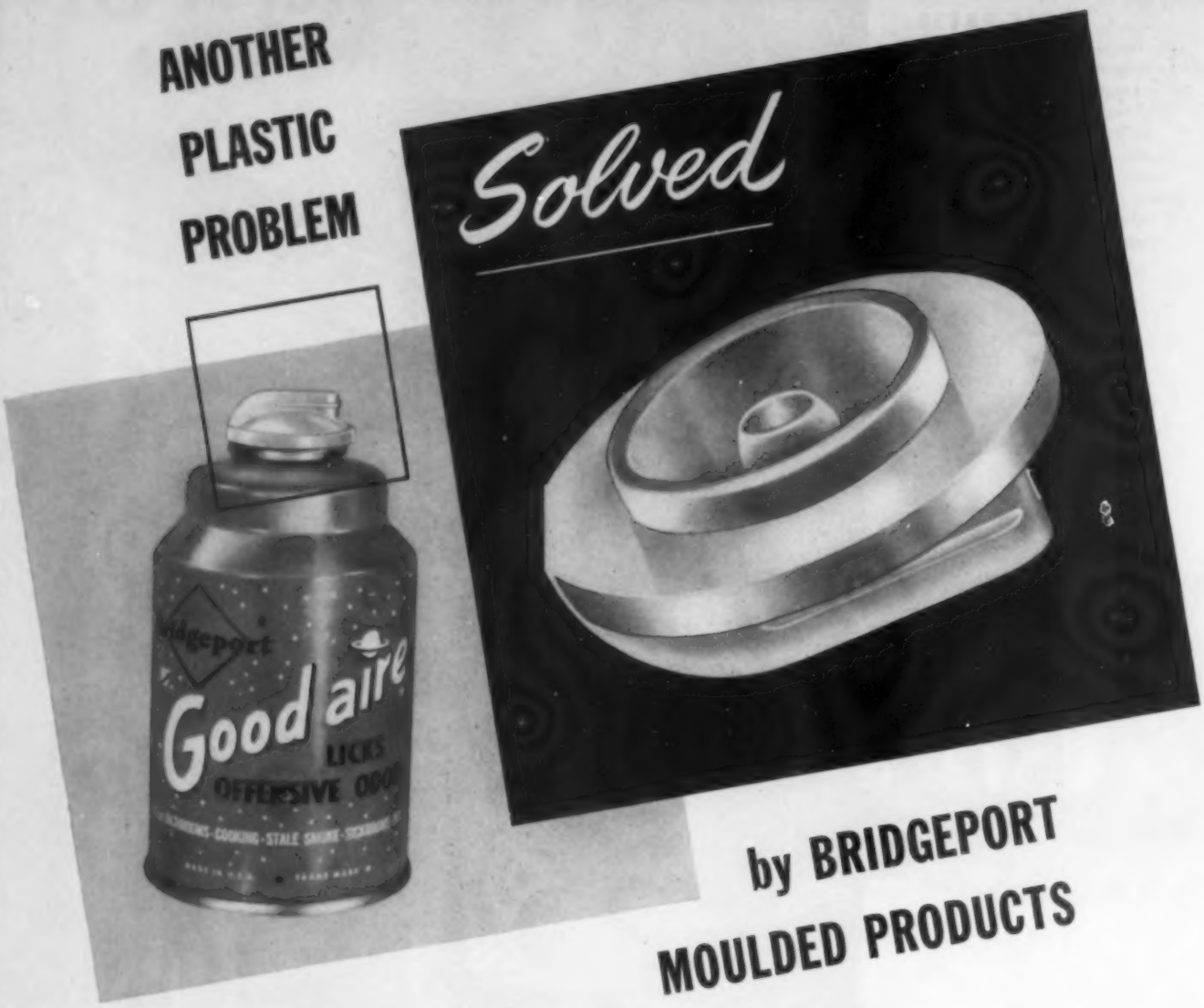
This mammoth press, used for molding the Admiral cabinets, stands 30 feet high and weights 125 tons. It is capable of exerting 2000 ton pressure. The molding bed measures 96 inches on each side, with 54 inch clearance between pillars. The 60 inch stroke exposes 128 inches of "daylight." In several respects, it is believed to be the largest press now in use for molding plastic materials.

ever!

THE PROOF

Rugged strength beneath a petal-smooth exterior is amply demonstrated in this picture. Here the cabinet has been photographed supporting 1265 pounds of weight.

ANOTHER PLASTIC PROBLEM *Solved*



by BRIDGEPORT MOULDED PRODUCTS

HIGHLY SPECIALIZED PLASTIC CAPS FOR FAMOUS Bridgeport Brass

Aer ★ A ★ Sol PRODUCTS — ANOTHER BRIDGEPORT MOULDED SUCCESS STORY!

Once again, The Bridgeport Brass Company leads the industry in progressive product development. Recognizing the tremendous possibilities of the principle of liquefied gas dispersion of chemicals used in the insecticide sprays they produced for the Navy in World War II, Bridgeport Brass is now merchandising a new line of Aer-A-Sol products. Goodaire, a new space deodorant, is already gaining great consumer acceptance.

When Bridgeport Brass needed a special plastic cap for their new products . . . they called on Bridgeport Moulded Products. Problem: The cap must house two right angle valves, must meet very close tolerances, must resist chemical reactions and must stand up under heavy use. Result: Bridgeport solved all these problems with an injection moulded cap of Polyethylene that has helped make Goodaire the success it is! At Bridgeport, we have the knowledge and experience — gained through years of meeting the most exacting job requirements — plus the complete facilities to solve *any* plastic fabricating problem. Why not call on our "Plastic Engineer" today?

Write to....

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BOX 3276-O BARNUM STATION BPM BRIDGEPORT 5, CONNECTICUT

What new applications new products can you make with truly boilable CEREX?

Collars and caps molded of Cerex by Popular Plastic Products Corp., Northport, N. Y., for The Dalore Corporation, 32 W. 22nd St., N. Y. C.

Here's a happy item . . . new, sanitary, disposable baby bottles, vital parts of which are molded of Monsanto's *high heat-resistant* (108-112° C.) thermoplastic molding compound, CEREX.

Cerex's unique combination of high heat distortion, (it can be boiled over and over) dimensional stability, and added strength characteristics make it ideal for this product.

And Cerex gives you a similar ground floor opportunity . . . to introduce new products, heretofore impractical with ordinary plastics or other raw materials . . . to improve old products, give them new performance standards, new selling features.

Possible applications of Cerex are almost unlimited: Household merchandise, electrical components, surgical and medical appliances, industrial applications, etc.

Priced for commercial use, Cerex can be molded on standard injection machines, may be extruded, is machineable.

Write *today*, or send the coupon for full information on Monsanto's Cerex. Cerex: Reg. U. S. Pat. Off.

JUST REMEMBER: You get a bigger dollar's worth when you buy Monsanto Plastics.

CEREX Data Chart

Property	Average Value
Molding Quality	Good
Injection Molding Temp. (°F)	375-575
Injection Molding Pressure (psi)	10,000 up
Specific Gravity	1.04-1.06
Flexural Strength (psi)	10,000-15,000
Flexural Deflection (inches)	0.20-0.30
Tensile Strength (psi)	7,000-10,000
Elongation (%)	1.5-2.5
Impact strength (ft. lbs./in.) Izod (notched)	0.25-0.35
Heat Distortion (oil bath—°C)	108-112
Dielectric Constant @ 1 Mc	2.55-2.65
Dielectric Strength (step by step—volts/mil)	400
Power Factor @ 1 Mc	.0001-.0005
Rockwell Hardness	M70-M80
Water Absorption (24 hrs. —%)	0.04-0.08
Chemical Resistance	No effect from weak acids and bases or strong bases. Strong oxidizing acids attack.
Solubility	Soluble in esters, aromatics, higher alcohols and chlorinated hydrocarbons.
Clarity	Slight haze
Color Possibilities	Almost unlimited

Values determined under appropriate A.S.T.M. methods.

MONSANTO
CHEMICALS—PLASTICS

MONSANTO CHEMICAL CO., Plastics Div.,
Desk No. MPLP 19, Springfield 2, Mass.
Please send me information on Cerex.

Name Title

Company

Address

City Zone State

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Take the easy, low-cost way to give your product the full protection of polyethylene. Use flexible, seamless Plaxpak Layflat tubing. It saves wrapping motion, wrapping time, and makes a better package. There are no corners to catch and no difficult folds to seal. The product is inserted, not enfolded. Layflat tubing comes plain or gusseted. Plax supplies it in continuous rolls, but it can be obtained from your regular converter in the form of bags, envelopes and pouches.

PLAX
FOR PLASTIC
SHEET ROD & TUBES
NOT SUBSTITUTES ... IMPROVEMENTS

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In Canada — Canadian Industries, Ltd., Montreal

At the center of activity...

STUDEBAKER

USES A FUNCTIONAL DECORATION

IN ERIE RESISTOR

Three Dimensional Plastics

● This Studebaker horn button is a jewel . . . always in the driver's eye; it's a constant spur to pride in ownership, an unmistakable identification to admiring passengers. Erie Three Dimensional Plastics combine a depth and richness of color with a permanence that is untouched by wear, untarnished by time.

The design called for a high dome with heavy wall thickness, with gating possible only through the narrow wall section of the bottom of the flange. To produce the button without weld lines, air bubbles, or flow marks, which would vitally affect the quality during the painting and plating operations, accurate temperature control of material and die, and split-second timing of the molding cycle was essential.

Your plastics problems, whether of design or production, are in safe hands when you come to Erie Resistor.

ER

WHEEL OF QUALITY

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

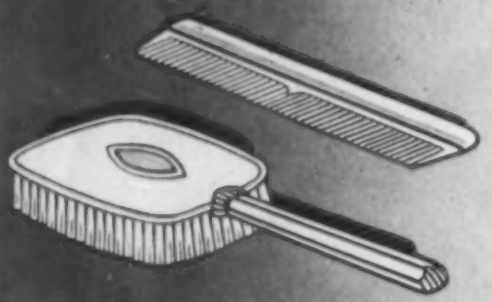
LONDON, ENGLAND · · TORONTO, CANADA

FOR THE GREATEST

WHITENESS • BRIGHTNESS • OPACITY

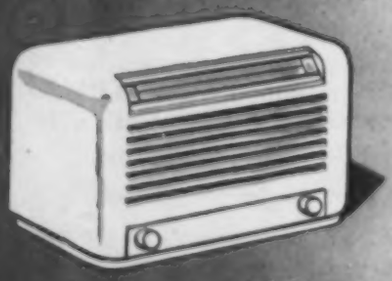
IN PLASTICS . . .

. . . USE



TITANOX

PIGMENTS



● Plastic compounders know from experience that these titanium dioxide products are the strongest among white pigments in brightening, whitening, tinting and opacifying power. Desired results are achieved with minimum loading, thus contributing to flexibility and economy. TITANOX pigments also possess excellent physical and chemical stability. You may have complete opacity or you may control the degree of translucency as required.

TITANOX pigments are available in rutile types to assure the most effective application in plastics. In vinyl sheeting, for example, they are preferred because of their maximum opacifying power as well as improved sunlight resistance.

Our Technical Service Laboratory staff will be glad to furnish additional data or help you choose the proper grade of TITANOX for your products. Telephone or write our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 So. Michigan Ave., Chicago 3, Ill.; 2600 So. Eastern Ave., Los Angeles 22, Cal. Branches in all other principal cities.

®TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

ASSIGNED TO ACTIVE NAVY DUTY...

BALDWIN 100 TON PRESS

BALDWIN 300 TON PRESS

Equally adaptable to long production runs or to experimental work, these Baldwin Hy-speed plunger molding presses are doing important jobs for the United States Navy. The 100 ton press is installed at the Naval Ordnance Station, Alexandria, and the 300 ton unit at the Navy Gun Factory, Washington.

Wherever there is plastic molding to be done, the modern features of Baldwin plunger molding presses recommend them for the job. The famous Baldwin hy-speed hydraulic system is used, which provides extreme flexibility of operation without complication. Ram speed, slow-down position, ram tonnage, pull-back tonnage, and ram return speed are all separately and steplessly adjusted. Individual timers provide for independent setting of dwell and cure periods. For plunger applications, separate control of mold clamping pressure and top plunger molding pressures is included. These merely suggest the wealth of features and advantages offered by Baldwin presses. For full details, ask for Bulletin 251.

The Baldwin Locomotive Works, Philadelphia 42, Pa., U.S.A. Offices: Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington. In Canada: Baldwin Locomotive Works of Canada, Ltd., Toronto, Ontario.

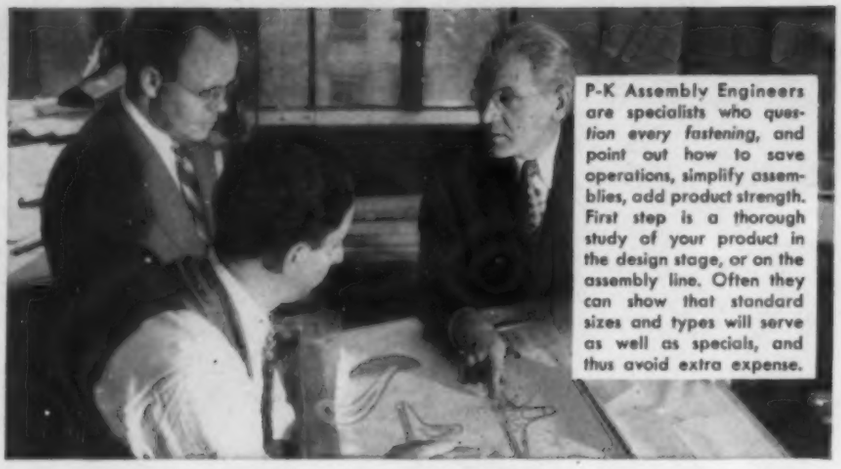
BLW THE BALDWIN GROUP

BALDWIN

HYDRAULIC PRESSES

P-K Assembly Engineering Service

helps you start here to Save up to 50% or MORE on Fastening Costs



P-K Assembly Engineers are specialists who question every fastening, and point out how to save operations, simplify assemblies, add product strength. First step is a thorough study of your product in the design stage, or on the assembly line. Often they can show that standard sizes and types will serve as well as specials, and thus avoid extra expense.

When required, tests of recommended fastenings are made in Parker-Kalon's Engineering Service Laboratory.

All recommendations are combined in a complete report furnished as a guide for assembly operations.

Qualified by thirty-five years' experience, Parker-Kalon Assembly Engineers can sit in with designers and assembly supervisors and *show how* to adapt the simpler, operation-saving P-K method, how to cut out all needless fastening expense. That's one of many reasons why . . .

more FASTENING-WISE MANUFACTURERS CALL ON PARKER-KALON

Look at all these other advantages...

MORE Know-How — Parker-Kalon originated the Self-tapping Screw and has been the leader with new designs ever since.

MORE Types and Sizes — With a complete line of Self-tapping Screws for every metal and plastic assembly, P-K's advice is unbiased.

MORE Exacting Quality Control — P-K's investment in laboratory testing and inspecting equipment is unsurpassed.

MORE Production — Parker-Kalon is the world's leading manufacturer of Self-tapping Screws.

MORE Top-Rated Distributors — Everywhere throughout the nation P-K Self-tapping Screws are readily available.

PROMPT DELIVERIES from stock on most types and sizes.

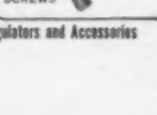
Call in a P-K Assembly Engineer and find out where you can start making savings you've been missing. If you prefer, mail assembly details for recommendations. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y.

P-K® *The Original*

PARKER-KALON SELF-TAPPING SCREWS

FOR EVERY METAL AND PLASTIC ASSEMBLY

P-K Also Makes *Cold-forged*



OTHER P-K PRODUCTS: Cold-Forged Socket Screws, Wing Nuts, Thumb Screws • Hardened Screwnails and Masonry Nails • Shur-Grip File and Solder Iron Handles • Metal Punches • Damper Regulators and Accessories

• Here is an unretouched photograph of a ¼ in. thick, compression-molded plate fabricated by Plax Corporation from BAKELITE Styrene BMS4-A1. Note its unblemished, crystal-clear transparency.

You're Looking at the CLEAREST Styrene Plastic Available!

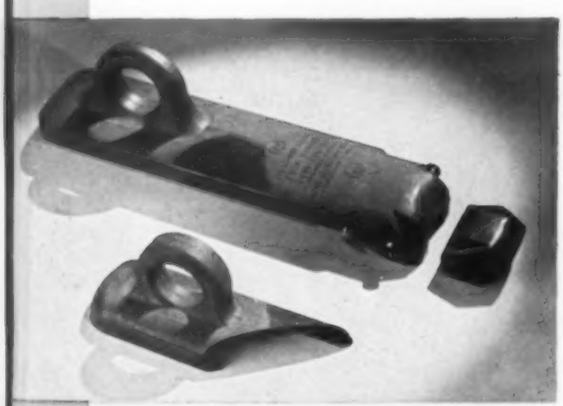
❶ You have much to gain by investigating *general-purpose* BAKELITE Styrene Plastics, which provide among the polystyrenes available today:

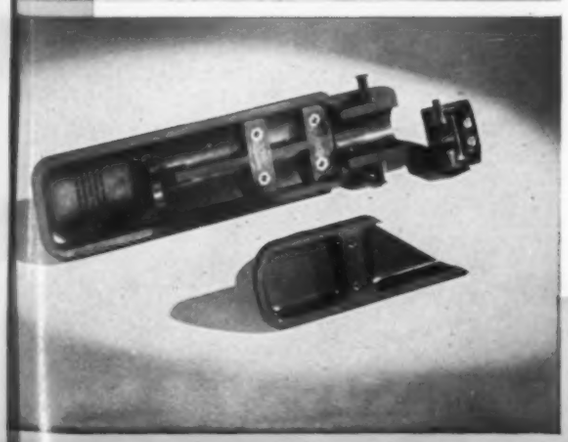
- **Greatest clarity and brilliance.**
- **Maximum cleanliness, at topmost requirement for whites, pastels, and colors.**
- **Ready availability as standard materials at standard low costs.**

These general-purpose Styrene Plastics come in two types. The *BMS4 group* offers the utmost in clarity, but needs higher heat applied to both material and mold to facilitate flow. The *BMS6 group* is specially processed to provide easier flow and excellent mold release at customary temperatures. Common to both groups are moldability to fine detail and lustrous finish, with strong acid- and alkali-resistance and excellent electrical insulating properties.

BAKELITE NEWS NO. 6

NOTES FROM BAKELITE CORPORATION ON BETTER, FASTER, LOWER COST PRODUCTION WITH "BAKELITE" PLASTICS

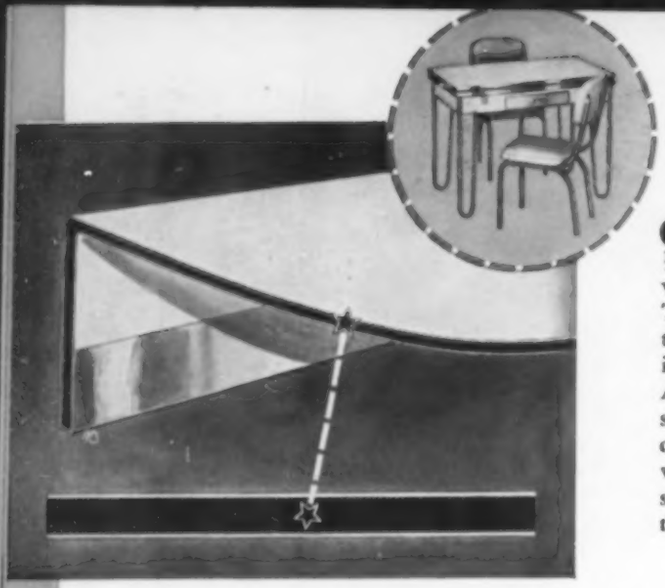




SIXTEEN YEAR Durability Test!

❷ The durability of BAKELITE Phenolic Molded Plastics has long been recognized as one of their chief attributes. Dramatic evidence of this durability was recently presented by the Line Material Company, manufacturers of fuse cutouts for power lines. These cutouts are fitted with doors or covers molded from BAKELITE Phenolic Plastics. The Line Material Company placed them on their roof test rack for exposure against the elements in highly corrosive atmosphere. The smaller cover illustrated has been exposed for 16½ years, the larger cover for more than 10 years. Both covers were sawed apart for examination of the interior construction. There was no deterioration. Although the surfaces had been dulled by the many years of weathering, the original lustrous finish was easily restored by buffing, as can be noted by the polished areas.

MORE BAKELITE NEWS ON NEXT PAGE



❶ Cutaway of a section of the ½" thick "Lloydite" table top, the heart of which is paper core stock impregnated with BAKELITE Phenolic Laminating Plastic.

It's What You Don't See That's ALL IMPORTANT!

❸ "Lloydite" table tops are plastic laminate all the way through, ½ in. thick, heat- and compression-molded in one operation, during which the "waterfall" edges and corners are formed and trimmed. They resist cigarette burns, alcohol, fruit acids, boiling water, and the many other hazards of the kitchen. BAKELITE Phenolic Laminating Varnishes are employed for impregnation of their core stock. Although unseen, the presence of these varnishes in the laminated structure is all important. They impart high tensile, flexural, and compressive strengths; low water absorption; corrosion resistance; wear and abrasion resistance, and lightness in weight. The ease and speed with which these phenolic varnishes are employed in treating the core stock makes for low cost production.

Is YOUR FOUNDRY Taking Advantage of RESIN Sand-Core BONDING?

Dielectric baking of resi bonded cores for railwa journal-box covers at t rate of two a minute. Photo courtesy Inductio Heating Corporation.

❹ Noteworthy advantages have already come from casting iron, steel, brass, bronze, aluminum, and magnesium . . . with the help of BAKELITE Phenolic and Urea liquid and powder resins as binders for the sand cores. Some of these advantages are: shorter core baking cycles than with non-resin binders, more uniform high quality of cores, improved collapsibility of cores, minimum moisture pickup permitting longer storage of sand cores to match the needs of production lines, and smoother surface finish that reduces the cost of cleaning castings. Sand cores made with these resins are suitable for either oven or high frequency dielectric baking.

A BIG Idea for Giant-Sized LAMINATES!

❺ These giant-sized pasting boards—used by the tanning industry—are "Consoweld" plastic laminated panels made with BAKELITE Phenolic Laminating Resins. They are produced in sizes up to 5 ft. 7 in. by 12 ft. 9 in. by ¼ in.—even larger on special order—by Consolidated Water Power and Paper Company. Besides being lastingly smooth, the boards are light in weight and resistant to mechanical shock, chemicals, and moisture. They have excellent machineability, and stability through the temperature fluctuations of the tanning operation. Do they suggest a *big* application for you?

Bakelite

TRADE-MARK

PLASTICS

BAKELITE CORPORATION

BAKELITE CORPORATION
Unit of Union Carbide and Carbon Corporation UCC
30 East 42nd Street, New York 17, N.Y.

Design Changes Are Easy with Versatile, Adaptable Plastics!

Check coupon below for information on specific subjects illustrated. For general information, write for copy of Booklet G-8, "A Simplified Guide to BAKELITE and VYNYLITE Plastics."

BAKELITE CORPORATION, Dept. A-13
30 East 42nd Street, New York 17, N. Y.

Please send information on subjects checked below:

- ☐ 1. BAKELITE Styrene Plastics
- ☐ 2. BAKELITE Phenolic Plastics
- ☐ 3. Phenolic Laminating Plastics for Table Tops
- ☐ 4. Resin Binders for Sand Cores
- ☐ 5. Phenolic Laminating Plastics for Large Panels

Your Name..... Title.....

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COMPOUND · COLOR · PELLETIZE

VINYLS • CELLULOSE ACETATE • ACRYLICS
POLYSTYRENE • POLYETHYLENE

for injection molding & extruding on well-known MPM equipment

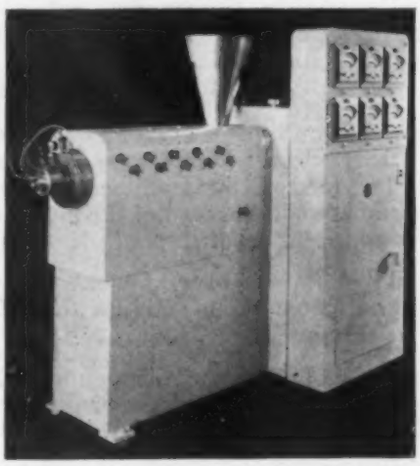
TESTED, LOW-COST SETUPS POINT WAY TO BIGGER PROFITS FROM PLASTICS

All over the world molders have expressed intense interest in the many advantages of compounding, coloring and pelletizing thermoplastic materials in their own plants, at low cost, on efficient, high-speed MPM extrusion and pelletizing equipment. In many cases considerably *less expensive* than purchasing molding pellets which have been colored and compounded by material suppliers, this method enables you to buy large, economical lots of uncolored crystalline, flake or granular thermoplastics and plasticize, color and pelletize to order, as you need them.

Large inventories of stock of every color are no longer necessary. No more waiting for special colors. No more off-size pellets. Using dry color mixes or master batches, you mix the *exact* color you want on your MPM extruder; you pelletize the *exact* size you want on your MPM pelletizer — quickly, efficiently, economically . . . in a continuous operation.

MPM MOLDING PELLET PRODUCTION SPEEDS

Basic equipment for a typical set-up might consist of two powerful 4½" MPM extruders which knead the colorant, plasticizer and resin into a homogeneous mass and extrude multiple rods. The rods feed directly into an MPM pelletizer which cuts them to uniform size without any fine particles. These machines, tended by a single operator, can dry mix and pelletize acetate at a rate of 500-600 pounds per hour. Pre-heating and milling the compounds before feeding into the extruders doubles their production. Other thermoplastics can be produced at equivalent rates. Not only is the MPM way of compounding and pelletizing less expensive, but the equipment needed costs only a *small fraction* of the cost of the heavy machines previously required.



Eighteen of a possible twenty leading material suppliers use MPM extruders.

BIGGER UNITS COMING

Soon to be completed is a special MPM 6" extruder designed exclusively for compounding. This giant unit will extrude multiple rods for pelletizing at 1000-1500 pounds per hour. Costing only slightly more than a 4½" extruder, it will have twice the production capacity.

Don't lose sight of the fact that your MPM extruder, with six automatically controlled heating zones and 9, 11, or 15 jacketed cooling zones (depending on screw size) is a versatile *production extruder*, too. Every part that contacts plastic is made of stainless steel for long-time corrosion-free operation. It comes to you complete—even with dies if you desire. All you need do is connect your power and water lines and begin production. Many MPM installations operate as compounders and pelletizers at night and as custom shape extruders during daylight hours.

GET THE DETAILS TODAY

There are appreciable savings to be made by compounding, coloring and pelletizing thermoplastics yourself. The MPM equipment for performing these operations is very moderately priced—well within an attainable cost range. Send now for complete prices and details about efficient, money saving MPM extruders and pelletizers. Don't delay!

modern plastic machinery corp. mpm

15 UNION ST., LODI, N. J.

CABLE ADDRESS MODPLASEX

NOW! THE REVOLUTIONAR

Slashes production costs

Revolutionary is right! Just picture a single machine that can compound resins, plasticizers, colorants, fillers and stabilizers — then extrude or pelletize the finished compound — all in one continuous rapid-fire operation, and at an impressively lower cost per pound than by present-day methods!

IF YOU'RE AN EXTRUDER..

If you're an extruder, the Compounder-Extruder means that in many cases you can save the entire cost of compounding. Why? Because the Compounder-Extruder can compound *and* extrude in a single continuous uninterrupted operation. Consequently, the cost of the extruding often includes the cost of compounding as well!

IF YOU'RE A MOLDER..

If you're a molder, the Compounder-Extruder makes it possible for you to compound and color your injection molding materials and form them into pelletized feed — *in one continuous process* — ready for immediate use in injection molding hoppers.

And whether your business is molding *or* extruding *or* both, the Compounder-Extruder will drastically lower many of your other operating costs as well . . . You'll be freed of burdensome inventories of pre-mixed compounds. Just as important, you'll be freed of the bugaboo of erratic deliveries of special formulations and resultant disrupted plant scheduling.

Actually, you'll stock only pure pigments or dyes, and resins and plasticizers; then compound, extrude, or pelletize them into special formulations from day to day as they are needed.

And this same revolutionary Compounder-Extruder solves your scrap reclamation problem as well. Just reprocess your scrap in the Compounder-Extruder—either "straight" or re-mixed with virgin resins—and it's ready to use again!

there's a size for every job

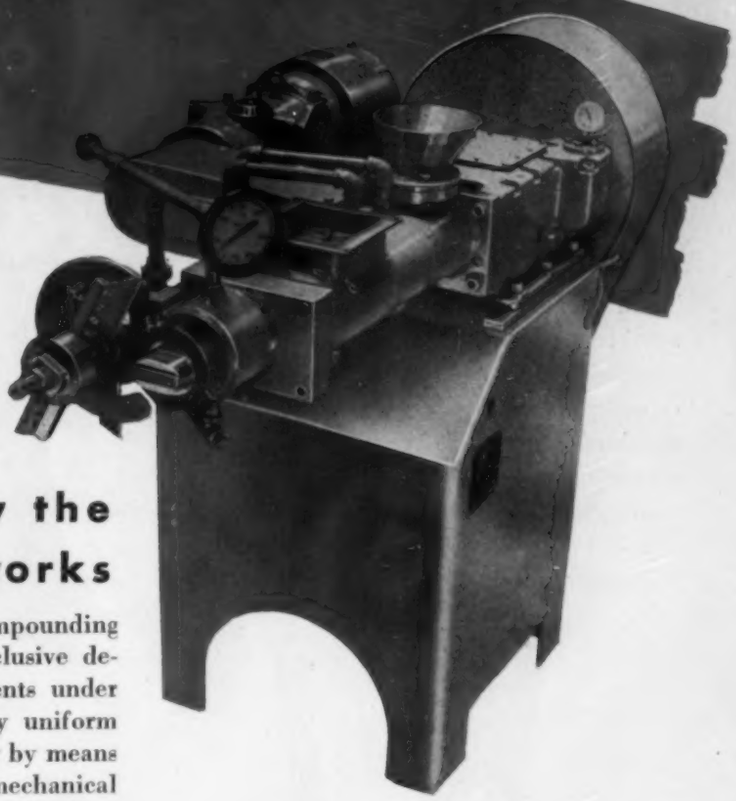
There are five models, with outputs ranging from an average of 110 pounds per hour in the smallest model to an average of 1,300 pounds in the largest.

Compounder-Extruder Model	Average output in pounds per hour	Normal horse power
Series 2000	110	7½
Series 2800	225	15
Series 3500	400	30
Series 4500	700	60
Series 6000	1300	125

These features are common to all models

5-zone heating jackets
Maximum temperature — 500°F
Torquontrol—continuous indication of mechanical torque with automatic overload cut-out
Replaceable barrel liners
Interchangeable heads and extrusion dies

COMPOUNDER-EXTRUDER*



here's how the COMPOUNDER-EXTRUDER works

The secret is largely in a special "pressurized" compounding cylinder that contains *two interacting worms* of exclusive design*. These worms knead and work the components under high pressure and elevated temperatures. Unusually uniform heat is generated throughout the compound—not only by means of a heated cylinder jacket—but largely through the mechanical action of the worms themselves. Because so much of the heat is generated *mechanically*, jacket temperatures are *not* critical and often are as much as 40°C *under* the temperature of the compound itself. Thanks to the short "heat history" thus achieved, (often as little as two or three minutes), danger of degrading the compound is reduced to an absolute minimum. Action of the Compounder-Extruder is largely automatic. After the formulation is given a simple mechanical pre-mix, it's just dumped into the Compounder-Extruder hopper. That's all: in go raw materials at one end—out at the other come completely extruded or pelletized finished products!

COMPOUNDER-EXTRUDER *pays for itself — f a s t !*

That's right! The Compounder-Extruder is completely self-liquidating. Its entire cost can be amortized well within the authorized depreciation period for capital equipment. And when operated at or near rated capacity, its savings in compounding charges can completely cover its purchase price within a reasonable period of time.

Add the many indirect savings the Compounder-Extruder affords — through simplified inventory practices and plant operating procedures — and you'll see why the Compounder-Extruder will be one of the soundest single investments your company can make.

GET DETAILS NOW!

Don't delay your investigation of the potentialities of the revolutionary new Compounder-Extruder. The mere fact of its existence intimately and seriously affects your entire plant set up and your entire cost and pricing system.

Write today for detailed specifications, prices and delivery dates. And to insure that our reply is comprehensive, be sure to include data on the type of operation for which you contemplate using the Compounder-Extruder (materials, output, present methods of processing).

machinery division

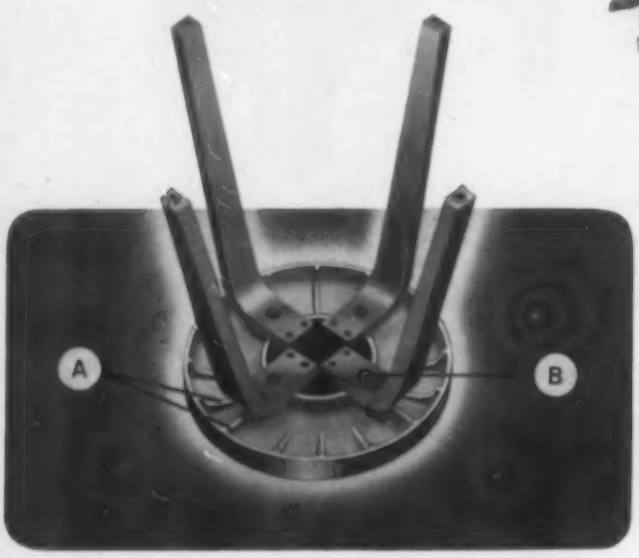
WELDING ENGINEERS, INC.

NORRISTOWN, PENNSYLVANIA

*Patents issued and pending

PLASTICS
THE SEAT OF MODERN DESIGN

Thonet Bros., Inc. designed this modern bath stool to meet the high standards and rough treatment of hotel use. They wanted to produce it in quantity . . . avoid excessive weight . . . keep all the sturdiness found in clumsy old patterns. They wanted the seat in soft, pastel shades. With water resistance in mind, Aico suggested economical urea. Glossy black was added to the line with sturdy, light phenolic.



Weight . . . and cost . . . were kept low by using thinner sections and reinforcing with appropriate ribs (A). Assembly was simplified and speeded by molding in four threaded brass inserts (B). The mold was polished like a mirror to produce a lustrous sheen with no buffing. Compression molding in one of our 450 ton presses turns out these fine seats, finished except for flash removal, at a rate of better than one every ten minutes.

Plastics, adapted with understanding and molded with skill, can key many things to better acceptance in the market of today. Our portfolio of Aico Plastics Applications contains pictures and details of many actual uses of modern molded plastics. Write for your copy today.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa.

AICO
PRECISION MOLDING
for over 30 years

MANY THINGS ARE BETTER BECAUSE OF PLASTICS

MODERN PLASTICS

VOLUME 26 JULY 1949 NUMBER 11

Child can dramatize famous nursery rhyme with Humpty Dumpty toy molded of cellulose acetate. Package doubles as the wall from which the "great fall" took place. For result of fall see picture at bottom of p. 57

TOYS CAN BE DIFFERENT

Nine examples of how the properties of plastics can be utilized by ingenious designers to create new toys and improve old favorites

THERE are plenty of good toys in the highly competitive toy industry. But the toys which get ahead in the race for sales dominance are those which are more than just good—the ones which are cleverly conceived, ingeniously designed, and well made.

Sometimes a superior toy is born by taking a product or idea from the adult world and creating a toy in its image. Sometimes a vastly improved toy is evolved by redesigning a well-known toy to take advantage of the properties of plastics. Sometimes a completely new approach or new concept gives birth to an outstanding toy.

The general field of plastic toys was surveyed in these pages over a year ago.[1] Many new plastic toys have been put on the market since that time. Some of them have already been described in these pages; others will be covered in future issues. The present article is therefore limited to a detailed discussion of nine toys which are somewhat unusual in their conception or design.

Blocks with action

An award in the Toys classification of the Seventh MODERN PLASTICS Competition was won by the Koo Zoo blocks made by Kusan, Inc., Nashville, Tenn.[2] These blocks make ingenious use of the transparency of polystyrene to improve on children's blocks. The transparent blocks have opaque molded plastic animals inside them. This year the same company carried the same principle one step farther and introduced its Kusan Karnival blocks—which have *movable* plastic figures inside them. (*Turn to next page*)

[1] "Toys," MODERN PLASTICS, *25*, 75-81 (May 1948). See also the article, "Toys," (pp. 86-95) in the "Plastics in Use" section of the "Modern Plastics Encyclopedia, 1949."

[2] "Toys Award to Kusan, Inc., "MODERN PLASTICS *26*, 176 (Sept. 1948).

Left: Ferris wheels, animals, and carnival characters inside transparent polystyrene blocks move when child manipulates the block. Below: Each block is molded in four parts, has many small internal parts such as Ferris wheel parts shown

The blocks are sold in sets of eight, packaged in a box which can be set up to serve as a carnival tent. Each block contains a different set of figures and the child has to learn how to manipulate each block to make the figures "perform." The set is made up of 1) a merry-go-round; 2) a ferris wheel; 3) two figures on a see-saw; 4) a dog which jumps through a hoop; 5) a bicycle rider on a "tight rope"; 6) a dancing animal; 7) two seals which juggle a ball; 8) two men who juggle some hoops.

Each block is molded in four pieces, not counting the 37 internal parts used in the set. The opaque bottom pieces and transparent top pieces have molded-in circular sockets or curved ridges which serve as guides for mounting the internal parts. The four transparent sides of each block consist of two right-angled pieces with mating ridges and grooves. The block is molded in four pieces to simplify assembly of the small internal parts. The blocks are 2-in. cubes and have wall sections of 0.080 inch. All parts, including internal parts, are polystyrene.

The blocks are molded by Kusan in two 8-cavity molds, one for the tops and bottoms and one for the side walls. The internal parts are molded in two additional dies, one with 20 cavities and one with 28. All four dies were made by Plastic Mold & Die Co., Cleveland, Ohio.

Tower of disks

A wooden toy which has long been a favorite is a set of disks, graduated in size, and pierced so that they can be slipped over a peg and built into cones. Taplin Toys, Inc., Minneapolis, Minn., has recently introduced a similar toy which adds a number of improvements which are economically possible only because the toy is made of plastic.

Child learns shape perception by putting pegs in proper holes, fitting disks on pegs. Disks also serve as rattles

The toy, known as the Tappy Tower, has eight disks, three pegs, and a base, all molded of polystyrene by Commercial Plastics Co., Minneapolis. Each disk is molded in two halves, is hollow, and can double as a rattle.

Instead of the single round peg customary in the wooden version of the toy, the Tappy Tower has three pegs: one round, one oblong, and one triangular. The base has three molded-in holes, one to fit each of the pegs. Each disk has an irregular hole which is a combination of the three peg shapes. Each disk will fit on any peg, but only if it is placed in the proper position. This teaches the child shape perception and sustains his interest by challenging his ingenuity.

Pasteless "paste-ups"

Two different plastic materials are used in the new Pick-er Stick-er, a toy which gives the child the

fun of making paste-up pictures but liberates the mother or school-teacher from the fear that paste or glue will find its way into furniture, clothes, skin, or hair. Instead of an adhesive, the new toy makes use of molecular attraction of highly polished surfaces to hold vinyl cut-outs on a cellulose acetate surface.

The Pick-er Stick-er, manufactured by Atlantic Plastics, Cleveland, Ohio, has a work board which has cellulose acetate film 0.001 in. thick laminated to it. Arvey Corp., Chicago, does the laminating. The forms are die-cut from vinyl film, the smooth surface of which will adhere to polished surfaces when pressed on. By arranging and re-arranging colored, differently shaped vinyl pieces, the child can make any number of pictures and designs. The border of the work board offers pattern suggestions such as letters, trucks, trains, clothes, or abstract designs.

Once the child learns the technique, his imagination can take over.

Animated nursery rhymes

Just as the Karnival blocks introduce action to add play value to blocks, two other new toys have introduced action as an element in toys which are based on popular nursery rhymes. The new toys, manufactured by Playmaker Toys, Chicago, Ill., effectively dramatize the rhymes about Humpty Dumpty and Three-Men-in-a-Tub.

Humpty Dumpty is molded of cellulose acetate in eight parts. The egg-shaped head is molded in two halves with the features of the face molded on the front half and the entire rhyme molded on the back surface in raised letters. A flesh-colored material is used for these two parts; red lips, red cheeks, blue eyes, a white collar, and a red tie are painted on after molding. The other six parts (hat, two arms, two legs, and a squat "body") are molded of blue acetate.

The box in which the toy is packed is decorated to look like a stone wall and the "king's horses and king's men" are printed on it. When the toy is pushed off the box, or off the edge of the table, the eight pieces fall apart. The child can then demonstrate his superiority to the king's men by putting Humpty Dumpty together again.

Elmer E. Mills Corp., Chicago, molds the eight parts, using a four-cavity die for the head and a six-cavity die for the six blue parts. The latter mold has side pulls for molding the holes into which the legs fit. Bello's Art Studio, Chicago, decorates the face.

The Three-Men-in-a-Tub is a bath-time toy which consists of three squat little men and a tub into which the three of them fit. The tub has a hole in the bottom and a mast which fits into the hole. When the mast is removed, the tub slowly sinks, leaving the three men floating. The tub can also be used as a sand bucket, and the mast doubles as a spade.

(*Please turn to next page*)

Unlimited number of designs and pictures can be made by arranging vinyl cut-outs on work board with cellulose acetate surface. Molecular attraction between the two plastic surfaces holds cut-outs in place without adhesive

Acetate Humpty Dumpty, unlike one in rhyme, can easily be put "together again." Eight parts assemble by snap fit

Polystyrene Three-Men-in-a-Tub will float in water. Tub sinks when mast is removed, leaving three men floating. Tub can also serve as a bucket, mast as a spade, men as rattles

The men are weighted so that they will float upright; the weights permit the men to double as rattles.

The three men are molded in a six-cavity die (a front and back half for each man) and bonded by the use of carbon tetrachloride. The mast and tub are produced in a two-cavity mold. Elmer E. Mills Corp. does the molding. All parts are polystyrene.

Permanent wave doll

Among the most intriguing toys are those which reproduce something which the child has seen his elders using or has heard his elders talking about. An excellent example is the Toni doll manufactured by Ideal Novelty & Toy Co., Hollis, N. Y., by special arrangement with the manufacturers of the Toni home permanent. The doll has a special wig which will take a "permanent." This "permanent wave can be given with a Toni Play Wave kit which is sold with each doll.

The make-believe wave kit uses the same polystyrene curlers which are used in the real kit, and is packaged like the real Toni kit in a fuchsia and white striped box. The "wave lotion" in the play kit is a sugar-and-water solution which is safe for children to use and easy to duplicate when the original supply is used up.

The wig, which is the most important part of the doll and accounts for more than half of the cost of the entire doll, is made of nylon fiber. The doll itself is molded of cellulose acetate butyrate in six parts (body, head, two arms, two legs).

Doll which can be given a "permanent" has wig made of nylon fiber. Doll is molded of butyrate; curlers are polystyrene

Pantograph

Another toy which is simply a scaled-down version of an object used by adults is the Pant-O-Graf, made by Nu-Age Industries, Inc., Leominster, Mass. The toy is a simple pantograph which can be used to enlarge pictures, designs, cartoons, etc., five, four, three, two, or one and a half times, or reduce them in the same proportions. The arms of the pantograph are molded of transparent amber polystyrene so that they do not obscure the work as they are moved.

The four arms are molded by Commonwealth Plastics Corp., Leominster, in a four-cavity die. All holes are molded in, and the diameter and spacing

Designs, pictures, or cartoons can be enlarged or reduced with pantograph molded of transparent amber polystyrene

of the holes are held to close tolerance (0.001 and 0.002 in. respectively) to insure accuracy of the pantograph in use.

Ferryboat and cars

Small boys are invariably fascinated by boats onto which automobiles can be driven. The logical application of this fact to the toy field is a toy ferryboat with cars which can be "driven" aboard. Pyro Plastics Corp., Union, N. J., is now producing just such a boat.

The boat and the four small cars which come with it are molded of polystyrene. The boat floats, even when loaded with the four cars, but it also has wheels to give it play value when no suitable body of water is available. The boat is molded in seven parts: a superstructure, a flat deck piece, a hull, and four wheels. The hull has three separate "compartments" which become water-tight when the deck piece is cemented in place, and four wheel wells which are open at the bottom. The wheels thus project below the bottom of the boat far enough to be useful but not far enough to be obvious and detract from the realistic appearance of the ferryboat. Each axle is snapped in place in notches on the inboard bulkheads of each wheel well.

The deck piece has molded-in "planks," a central ridge which serves as a divider between the two car lanes, and ridges along the sides which help to position the superstructure piece during assembly. The superstructure has 62 windows molded in. The sprue on top serves as a smoke stack.

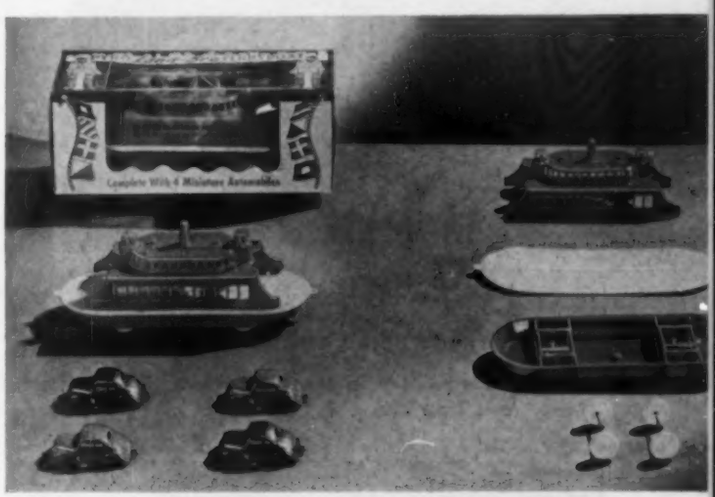
Balancing toy

Plastics are responsible for the simple design, and therefore the low price, of Circus Sam, a toy which utilizes the law of moments to defy (at least apparently) the law of gravity. Besides balancing in almost any position on his head, nose, or feet, Circus Sam can spin like a top or "juggle" hoops. The stand on which he performs can be used as a top, a toy clock, or, with the top piece removed, a peg for a game of ring toss.

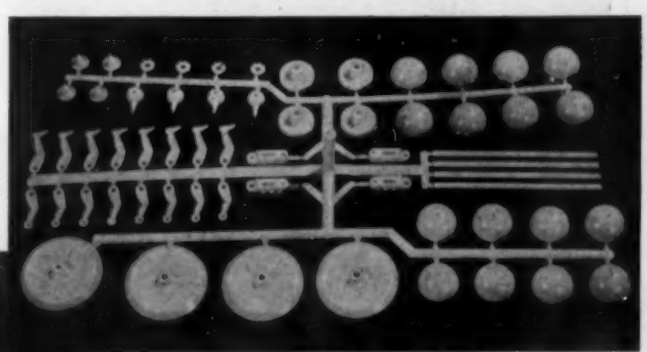
Lindex Corp., New York, manufactures the toy, which consists of a clown with balancing weights attached, the stand on which he performs, three hoops, and three disks. The only non-plastic parts are the wire on which the weights are suspended and the grommets used to attach the arms and legs to the body. All other parts are polystyrene.

Each complete set contains 23 plastic parts. A 60-cavity combination die is used to produce enough of the following parts for four sets: hats, heads, collars, torsos, arms, legs, weights (each molded in two halves), and the base, upright, and top pieces of the performing stand. The hoops, disks, and clock hands are the only parts which are not produced in this mold.

The foregoing examples show what some toy designers have done with plastics, but they represent only a small part of what has been done and an infinitesimal part of what can be done. Plastics enable designers to choose from a wide range of properties. Color, transparency, rigidity, flexibility, impact strength, or combinations of these properties can be obtained—plus intricate detail to lend realism to the finished product. Plastics and ingenuity are a powerful combination—and the sky is the limit.



Polystyrene ferryboat will float in water or roll on dry land. Boat has seven plastic parts; two axles are metal



Grommets used in assembly and wire on which weights are suspended are the only non-plastic parts in balancing toy. Polystyrene hats, heads, collars, torsos, arms, legs, weights, and the three-part performing stand are produced in 60-cavity die. Shot (above) contains parts for four sets

Razors in Polystyrene and Butyrate

Razor and two injectors fit compactly in maroon polystyrene inner holder. Top is white and the fluted base gray

DISTINCTIVE design in the permanent polystyrene container of the Twin-jector men's razor and the butyrate parts for the Deb women's razor lifts these two items from the usual and serves as a powerful sales stimulant. Both razors are products of Eversharp, Inc., New York, N. Y., and were designed by Raymond Loewy Associates, New York. E. B. Kingman Co., Leominster, Mass., molds the Twin-jector container of Lustrex, the Deb parts of Tenite II. Molds were made by Standard Tool Co., Leominster, Mass.

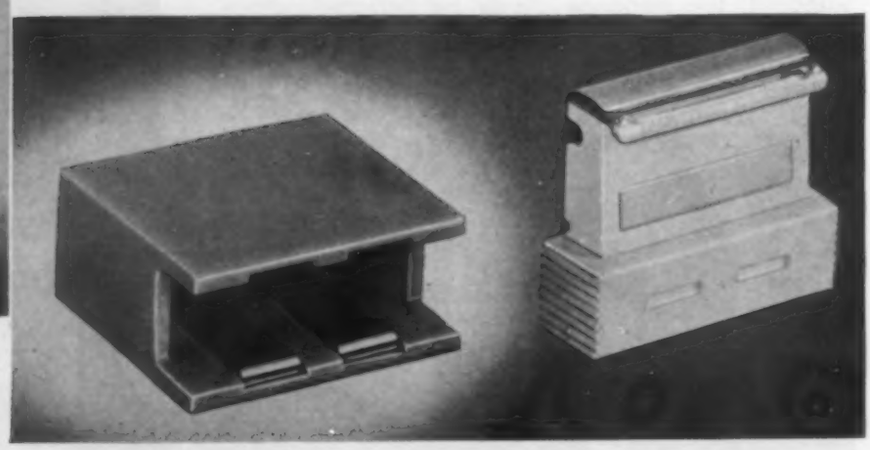
About the size of a tobacco tin, the Twin-jector container stands upright to save space in the usually cluttered bathroom cabinet and is small enough for use as a traveling kit. To meet with masculine approval, yet retain the clean look of bathroom accessories, careful consideration was given to color. The top is white; the fluted, easy-to-grasp base is medium gray; the oval name panels are part of the dark maroon insert inner holder.

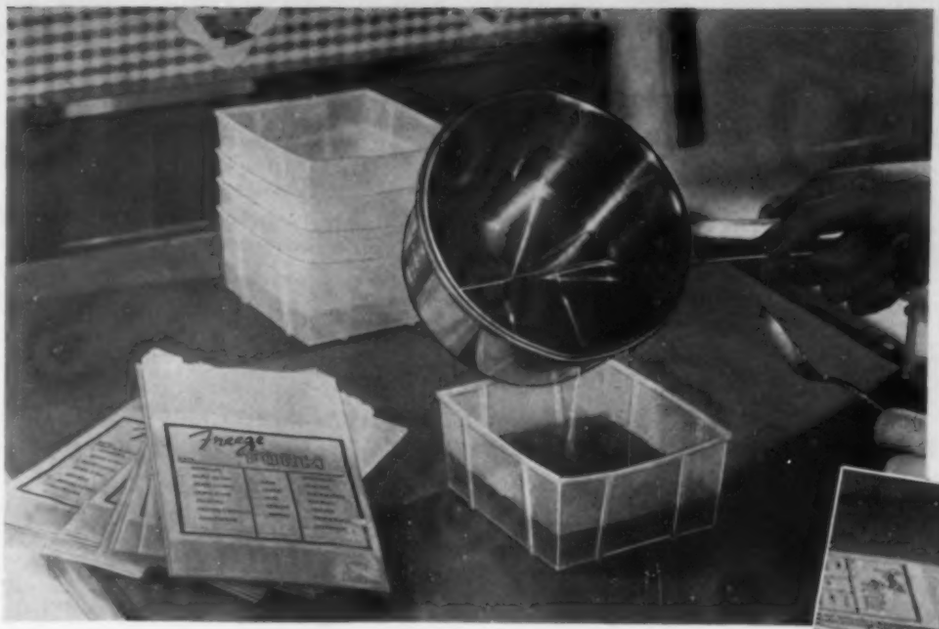
To protect the razor and two 20-blade injectors during shipment and subsequent everyday handling, the insert is compartmented and its openings scaled to hold the three units with least possible play.

The Deb, patterned after Eversharp's earlier Fashion Razor for women and resembling a compact, is smaller and retails for somewhat less than the original model. Butyrate parts consist of the pastel cover, white shaving head, and white base for the head. Two parallel 3/8-in. wide grooves are molded in the inside cover to accommodate two metal strips. These strips snap fit into the base and permit the cover to double as a handle when the shaving head is reversed for use. Included in the package with the Deb is a 10-blade injector and small brush.

Women's razor, housed in butyrate, stands upright in box. Underneath false black base is 10-blade injector and small brush

Pastel butyrate cover has inner metal strips which snap into base and hold razor firmly when in use. White base and shaving head are also butyrate





Left: Home freezing kit consists of six square polyethylene trays and 18 glassine bags with square bases. Food to be packaged is poured into tray, then put into refrigerator freezing compartment

Below: After food is frozen it is easily removed from tray by gently squeezing the polyethylene. Frozen square is then slid into bag. Date of freezing, type of fruit or vegetable is recorded on check list printed on each bag

Food Frozen to Form

Polyethylene trays, supplied in kits for home use, turn out neat, uniform blocks

ONE of the problems encountered by housewives in home freezing is that of package shape. Round packages are available for freezing of food but they don't pack economically in limited space; the freezing bags on the market, particularly when used with fairly fluid or soft fruits and vegetables, are likely to present a shapeless finished frozen unit.

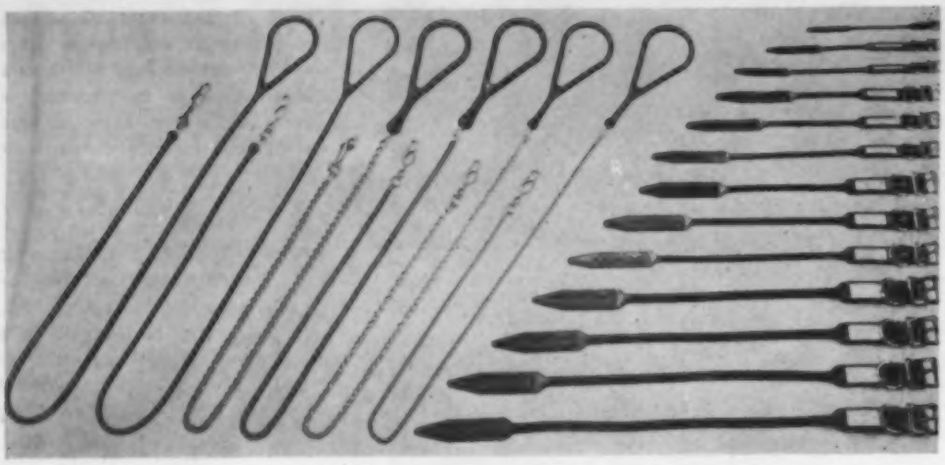
The coding and sealing of such home-frozen packs is also a problem. And freezing must be accomplished in a packaging material that is suitable for use in extremely low temperatures.

Complete freezing kit

These several problems are claimed to be completely overcome by the use of "Freeze Form," a product of the Freezing Form Co. Div., Sani-Therm Corp., Brooklyn, N. Y. This product is actually a kit consisting of six clear polyethylene trays molded by Boonton Molding Co., Boonton, N. J., and 18 glassine bags with square bottoms. The trays are approximately 4 by 4½ by 2 inches. The bags are so shaped and of such size that they will hold the same volume and shape contents as the trays while leaving sufficient top to overlap for heat sealing or fastening with tape.

Each bag has printed on it a check list of vegetables and fruits which may be frozen, plus space for recording the date of freezing. The kit is used by pouring the vegetable or fruit with its attending syrup or saline solution into the tray, placing it into the freezing unit of the refrigerator and, when it is frozen, gently squeezing the tray to remove the frozen block. The block is then placed in the bag, which is coded and sealed and put into frozen storage.

Should more bags be desired they may be purchased separately and the original six polyethylene trays used over and over again.



Collars are molded in 13 sizes, ranging from 7 to 27 inches. Six different types of leashes are made. Collars have molded-in receptacles for identification tags

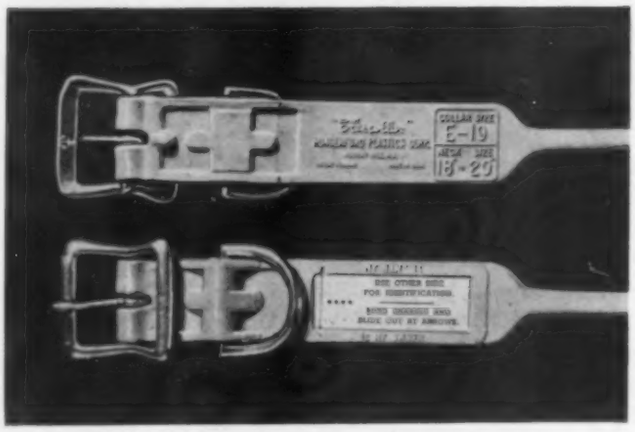
Dogs Wear Molded Vinyl

EVERY dog owner knows how easily a dog can make even the best leather collar look worn, dirty, and disreputable. The leather will scuff, absorb dirt and sweat, lose its shape, or tear. All of which means frequent replacement. As an answer to this problem, Hungerford Plastics Corp., Murray Hill, N. J., has developed colorful, durable dog collars and leashes injection molded of elastomeric vinyl.

The new Flex-collars are similar to round English style leather collars in appearance, but they cost only about ⅔ as much as good leather collars. Since they are molded in one piece and have no stitches, they cannot come apart. The vinyl will not scuff, will not absorb dirt or sweat, and can be cleaned easily with a damp cloth. The material used is Flexene, a special compound developed by Hungerford. Flexene is based on Vinylite resins and is compounded for high gloss and flexibility at temperatures ranging as low as —40° F.

Before going into production on the collars and leashes, Hungerford initiated a research project to determine what sizes would be needed, what colors would be preferred, etc. As a result of the research, Hungerford was able to draw up a size chart showing what size collar would be necessary for a small, a medium-size, and a large dog in each of 100 recognized breeds. The chart and a choice of four types of display racks are offered to retailers to help sell the line.

Hungerford discovered that manufacturers of leather collars customarily called the over-all length of the collar the "size." Hungerford fixed its sizes by the actual measurement of the collar when set at the middle hole, and allowed an inch leeway in each direction. Thus a size 15 collar, for example, will fit dogs with necks measuring anywhere from 14 to 16 inches. The size number and the information on the allowable variation is molded-in on each collar.



Flap is folded over hardware and electronically welded. Trade name and information on collar size are molded-in

Hungerford makes 13 sizes of collars, ranging from 7 to 27 inches. The smallest collar is ⅜ in. wide at the flat part and 5/32 in. in diameter at the round portion. The largest is 1¼ in. wide and ½ in. in diameter. Six colors are available: brown, black, green, blue, red, and white. The line also includes two weights of all-vinyl leashes and four types with vinyl handles and chromium plated metal chains.

Most of the vinyl collars are molded with a flap on the end where the buckle is to be attached. The buckles and D-rings are then put in place and the flaps bent over them and electronically welded in place. On the larger collars, a hole is molded into the strap, and specially developed hardware is then put through the hole and assembled in place.

The collars are molded in three combination molds which have arrangements for shutting off cavities so that production is not committed to a set percentage of each size collar. Two additional molds are used to produce the leashes.

S.P.I. Annual Conference

With "The Challenge to Plastics" as the basic theme, conference speakers dealt with problems of distribution, merchandising, and new methods of reducing costs

DECLARED by all present to have been the finest meeting ever held in the plastics industry, the S.P.I. 1949 Annual Spring Conference in Chicago, May 26th and 27th, reflected the pressure of the buyer's market, ready availability of materials, the need for new basic applications, the tremendous present and future importance of better distribution and selling methods, and the necessity for lowering production costs. Registration exceeded 450.

The Challenge to Plastics was the theme of the whole conference, keynoted by the opening session under the chairmanship of Charles A. Breskin, publisher and editor-in-chief of MODERN PLASTICS. By way of introduction, Mr. Breskin stressed the fact that the "too little—too late" charge referring to war materiel production in the early part of this decade might readily be leveled against the plastics industry concerning sales development, unless forthright steps are taken—and taken now.

"Men Make Markets"

The first speaker, W. W. Wachtel, president, Calvert Distillers Corp., one of the most inspiring business leaders in America, pointed out the social obligation of all business, which must be organized to give work, security, freedom, and dignity to all men if we are to retain the free enterprise system in the face of foul foreign propaganda.

"The mere fact that you have a good product is no guaranty that people will buy it. Quality is no full assurance of sales," said Mr. Wachtel. He hammered home the point that what the sales manager can sell is frequently more important than what the factory can make. He declared that more money is lost in unwise advertising and in inefficient use of advertising than in any other phase of distribution. He exhorted manufacturers to hang on to a good theme in advertising and to merchandise their advertising without delay in order to get full value for advertising dollars.

"Finding Your Markets"

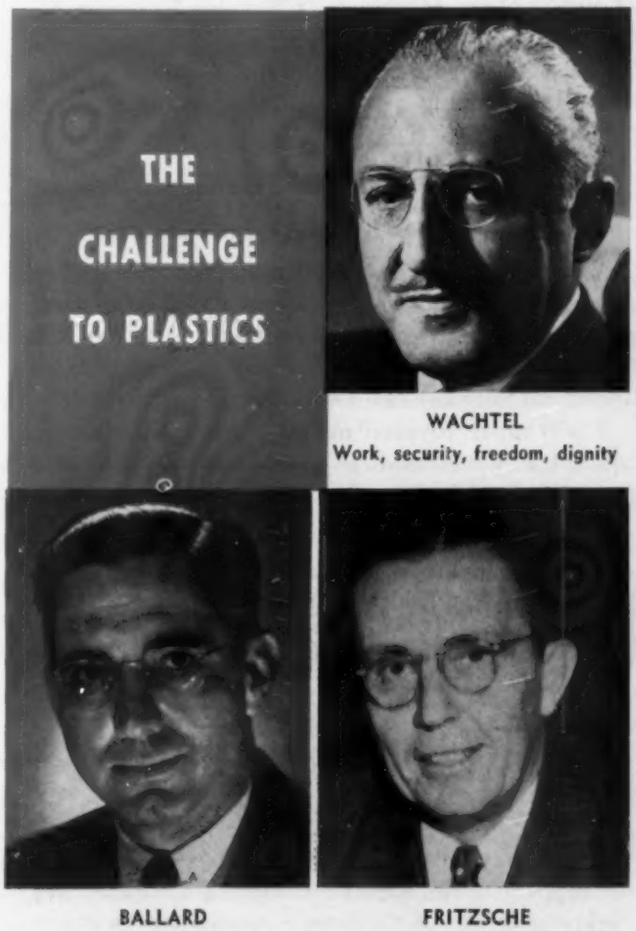
Referring to "ground floors" in industry over the past 60 years, Samuel M. Ballard, vice-president, Gardner Advertising Agency, proved by charts that the plastics industry, for all its magnificent expansion to date, is just now standing on the ground floor, is standing where the petroleum industry stood in 1900, where radio stood in 1922, where automobiles stood in 1910. He predicted a plastics production of 2,200,000,000 lb. by 1953 or a per capita consumption of 14.7 lb. of plastics compared with 1.7 lb. in 1938 and 9.3 lb. in 1948.

Any custom molder, Mr. Ballard said, has two markets: a) all industrial companies in his immediate trading area; b) the whole of the United States on some special type of production for which his plant is best suited.

And after market analysis must come vigorous, intelligent, and creative selling.

"How, When and Where to Sharpen Your Pencil"

Speaking on the subject of prices for custom molding and processing, Allan Fritzsche, president, The General Industries Co., declared flatly that management skill in the matter of costs will determine profit or loss tomorrow. (*Please turn to the next page*)



WACHTEL
Work, security, freedom, dignity

BALLARD
Intelligent, creative selling

FRITZSCHE
Know your costs

It isn't a matter of "cutting prices" but a matter of knowing costs so that they may be lowered efficiently. It isn't a matter of forgetting profits and selling at cost or lower in the hope of making the loss up later. It's a matter of lowering overhead and other costs to the point where business may be had at a profit.

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In summarizing the opening session Mr. Breskin suggested that industry needs to use the war-time policy of indoctrination and inspiration to teach employees in these times, needs more and better trained salesmen, needs more use of sales tools, and needs more study by all management of both markets and costs.

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INJECTION MOLDERS DIV.

CHAIRMAN of the Injection Molders Div. session was Edward Singer, president, Victory Manufacturing Co. Emphasis was on product development and trends in production methods.

"Design for Plastics Sales"

A progress report was given by A. R. Olsen, Hercules Powder Co., on his company's sales development program which was fully described on pages 74 and 75 of the May issue of MODERN PLASTICS. The program, Mr. Olsen stated, is paying off in promotion of new specific applications of cellulosic plastics as well as opening more general applications for all plastics.

"Controlled Flow, Balanced Gating, and Other Considerations in Polystyrene Molding"

A collection of data and "know-how" information on polystyrene molding, based on sound engineering principles, was presented by R. W. Van Sickle, Gordon B. Thayer, and E. L. Kropscott, Plastics Technical Service, The Dow Chemical Co.

Their paper covered new designs of runners and restricted gates and a discussion of theoretical pressure considerations in molding polystyrene, but time did not permit a discussion of other important factors, including control of mold temperature, flow control, balanced gating, molecular structure, and thermodynamic considerations.

Restricted gating alone is not a universal solution to molding problems, they said, but may be a big factor in improved molding of polystyrene, particularly in large parts.

OLSEN — Sales program paying off

VAN SICKLE, THAYER, KROPSCOTT — A big factor in improved molding of polystyrene, especially in large parts

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A surprise guest at the injection molders' session was Dr. iur. Max Laeis, general manager, Eckert & Ziegler Co., Weissenburg, Germany, the inventor of injection molding. Dr. Laeis stated that in the Western Zone of Germany there are now 300 injection molders using 15,000,000 lb. of material a year, mostly polystyrene.

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COMPRESSION MOLDERS DIV.

NEW types of equipment, improved materials, and a broader perspective on applications offer the compression molder plenty of opportunity for sound business operations in today's increasingly competitive market. This was the note of optimism which dominated the conference session on compression molding, with John J. Bachner, Chicago Molded Products Corp., serving as chairman.

Because of the growing emphasis on larger compression molded pieces, such as television cabinets ranging from 10 or 12 lb. to as high as 35 lb., molders showed keen interest in the talks on angle type transfer molding presses and on a newly developed phenolic material which can be molded at relatively low pressures, permitting the production of considerably larger parts on relatively small presses.

"Low Pressure Molding Phenolics"

A new material development which permits the molding of larger pieces on existing compression presses was described by E. F. Borro, Durez Plastics & Chemicals, Inc.

"Soft" phenolic type materials have been known to the compression field for some time, but in general they have been relatively slow curing and produced pieces having poor finish. During the past year, extensive research has resulted in Durez No. 1357 general purpose material, which molds at less than one third usual pressures, has a relatively fast cure, and has improved surface finish.

Because of the relatively low pressures involved, the material also offers opportunities for much lower cost tooling in Kirksite, beryllium copper, etc.

"High Speed Angle Type Transfer Molding Presses"

Speaking on "High Speed Angle Type Transfer Molding Presses," J. W. Tomka, Elmes Engineering

HYATT AWARD WINNER

DR. GEORGE T. FELBECK, vice-president, Carbide and Carbon Chemicals Corp., New York, N. Y., was presented with the John Wesley Hyatt Award for distinguished achievement in plastics on May 26, 1949. He received the Hyatt gold medal and a one-thousand-dollar cash prize at the annual meeting of the Society of the Plastics Industry.

Dr. Felbeck received the award for the engineering developments leading to the large-scale manufacture of polyethylene resins and plastics. Under his direction, a plant was created during the war which supplied the United States Navy with the plastic vitally needed for the radar program. The first unit reactor in the plant went into operation on April 23, 1943, and the first resin was produced on that date. By the end of 1943 this plant had produced almost 1,000,000 lb., or 50% above the Navy's initial demand.

Dr. Felbeck was born in Salina, Kan. He attended Manual Training High School in Kansas City, Kansas City Junior College, and the University of Illinois, from which he was graduated in 1919 with a B.S. in mechanical engineering. He first became associated with Union Carbide and Carbon Corp. in 1923. In 1925 he was assigned the task of setting up low-cost ethylene production facilities. He resumed his studies in 1938 at the California Institute of Technology from which he received his Ph.D. in physical chemistry in 1943. He is a member of Sigma Xi, Tau Beta Pi, Pi Tau Sigma, Phi Kappa Phi, and Sigma Pi.

In January, 1943, Dr. Felbeck was placed in complete charge of operation of the K-25 Gaseous Diffusion Plant project at Oak Ridge. In addition to the operation of this plant, he now supervises research and development at the Y-12 Electromagnetic Plant and the Oak Ridge National Laboratory.

First established in 1941, the John Wesley Hyatt award is under the sponsorship of Hercules Powder Co. It is presented annually to an individual making an outstanding achievement in the plastics industry. The conditions which govern the selection of Hyatt medalists are: the practicability of the achievement, its effect upon the plastics industry, its probable future value, and its degree of originality.

Members of the 1948 Hyatt Award committee are: George H. Clark, president, Society of the Plastics Industry; Dr. Linus Pauling, president, American Chemical Society; Dr. Charles F. Kettering, vice-president, General Motors Corp.; Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research; John D. Cochrane, Jr., director of research and development, The Formica Co.; Dean Richard F. Bach, Metropolitan Museum of Art; and Dr. Gerald Wendt, editorial director, *Science Illustrated*.

Works, described the flexibility of this type of equipment and some of its advantages from the standpoint of the molder. These presses, ranging up to 500-ton capacity, are equipped with cylinders and transfer rams on the outside, with cylinders guided by strain rods to keep the load off the columns. Side cylinders, of the double-acting type, are locked in perfect alignment with the transfer pots.

Whether or not the angle-type press is economical depends on the particular operating conditions. For the average job shop which handles long production runs, it offers several advantageous features, including the larger mold area which it can accommodate. Clamping pressures may be kept relatively low without producing flash.

"New Frontiers"

Of unusual interest at the Spring Conference was the special market research presentation on "New Frontiers for Thermosetting Materials," based on a comprehensive survey of industry made under the sponsorship of S.P.I.

William T. Cruse, executive vice-president of S.P.I., launched the presentation by pointing out the current situation in the thermosetting field. "Today," he said, "the day of business coming in on a silver

TOMKA
Flexibility with angle type press

BORRO
Larger pieces on existing presses

CRUSE
What size shroud would you like?

platter is over. The day of contracts obtained merely on the basis of a bid accompanied by blueprints is over. The mountain isn't coming to Mohammed anymore. . . A realistic appraisal of the situation points up one thing—the time has come when thermosetting molders have to hunt up business and sales on their own. And they have to do it on an aggressive basis if they want to remain in good sales health."

Here are some of the highlights of the S.P.I. survey, which were presented in dramatic fashion:

Automotive Industry: Five companies in this field were investigated relative to thermosetting applications. The study revealed that hardly any thermosetting material is being used in the 1949 cars, outside of a few small applications. But each company stated it was investigating the possible use of these materials in its 1950 models.

Business Machines, etc.: The survey here included covered typewriters, adding machines, calculators, and other types of office equipment. One point brought out was that at least one firm is making prominent use of the compression materials and that they have been important in reducing the size and weight of the machines. At the same time, styling has been improved.

Electrical Appliances: Television cabinets are among the outstanding new applications. New and larger thermosetting cabinets are appearing at frequent intervals, some of them ranging as high as 35 lb. in weight. Air conditioning units also offer great development opportunities.

Vacuum Cleaners and Refrigerators: There are some vacuums on the market using molded phenolic housings, but there is great opportunity for expansion in this field, not only in housings, but also in handles, knobs, and attachments. The refrigerator manufacturers are also interested in a plastic for cabinets.

Dairy and Farm Equipment: For dairy use, there is a problem of flavor change when milk comes in contact with certain plastics, but the problem is deserving of further investigation because of the volume potential.

Plumbing Supplies: One leading manufacturer is interested in a thermosetting, small-apartment sink that can stand abuse, and that has attractive color.

Textile Equipment: Such items as tension pulleys, spools, idler wheels, spindle bushings, bobbin bushings, etc., offer many outlets for thermosets, provided molders will study the industry's needs and show how the materials may be used to advantage.

★ ★ ★

In winding up this session, Mr. Cruse said: "Don't become complacent! Don't stand still! If you don't get out and seek for new applications—if you don't do something about new ways of merchandising—well then, what size shroud would you like to have?"

TOOL, DIE, AND MACHINERY DIV.

THE meeting of the Tool, Die, and Machinery Div. was presided over by Arthur J. Bachner, president, Midland Die & Engraving Co. As in other division meetings, new developments in production economies were featured.

"A New Concept in Large Thermoplastic Molding"

A new machine, described in detail on page 81 of this issue of MODERN PLASTICS, and designed to open new fields for large thermoplastic moldings, was presented by James Hendry, Jackson & Church Co. He cited the automotive, refrigeration, furniture, and display fields as offering opportunity for more work suitable to the new machine, which combines preheating by extrusion with a vertical transfer-type press operation.

"Hobbing Cavities in Alloy Steels"

More and more molders are using alloy hobbed cavities, stated John Sekowski, Midland Die & Engraving Co., due to the need for low cost and speed of die manufacture in today's markets.

As have plastics presses, hobbing presses have increased in size from 500 tons to over 3000 tons in the past 15 years. There has been a great improvement in steels for hobbed cavities, so that large units are now being made.

HENDRY
Smaller machines — larger pieces

SEKOWSKI
Low cost, fast die production

PRESS
Beryllium copper for fancy detail

NEW PRESIDENT, S. P. I.

HORACE GOOCH, JR., the newly elected president of The Society of the Plastics Industry, Inc., is treasurer and sales manager of Worcester Moulded Plastics Co. He was chairman of the New England Section of the S.P.I. in 1948 and 1949, and was one of the national directors of S.P.I. last year.

HORACE GOOCH, JR.

Mr. Gooch was born in Amarillo, Texas, on May 20, 1908. He attended Randolph Macon Preparatory School and Washington and Lee University, both in Virginia. In 1931, he was graduated from Washington and Lee University Law School with an LL. B. degree.

After graduation from law school, Mr. Gooch, returned to Amarillo and took a job with a wholesale automotive equipment firm as sales manager. The following year he married Jane Bradford, of Plymouth, Mass. In 1936, Mr. Gooch moved to Worcester, Mass., to take charge of sales of leather specialties for Graton and Knight Co.

He entered the plastics industry when he and Philip J. Graham established the Worcester Moulded Plastics Co., on October 28, 1939.

Mr. Gooch is a director of People's Savings Bank and of Industrial City Bank and Banking Co., both of Worcester. He is also a director of the Worcester Community Chest as well as treasurer and director of Worcester Hahnemann Hospital, and director of the Worcester Club.

***Other officers* elected at the meeting are are follows: George H. Clark, The Formica Co., chairman of the board; J. J. B. Fulenwider, Hercules Powder Co., vice-president; William S. Perry, Franklin Plastics Div., Robinson Industries, secretary; and J. E. Gould, Detroit Macoid Corp., treasurer.**

Sectional directors are: L. C. MacLeod, Monsanto (Canada) Ltd., Canadian Section; C. L. Cruver, Jr., Cruver Mfg. Co., Mid-west Section; Herbert G. Pratt, American Cyanamid Co., Pacific Coast Section.

Industry division directors are: Alfred C. Manovill, Ideal Plastics Corp.; E. B. Crawford, Auburn Button Works, Inc.; N. J. Rakas, National Automotive Fibres, Inc.; Monroe L. Dinell, Clover Box & Mfg. Co.; F. J. Groten, Firestone Plastics Co.; E. R. Perry, Micarta Div., Westinghouse Electric Corp.; F. W. McIntyre, Sr., Reed-Prentice Corp.

Directors at large are: D. R. Siragusa, Molded Products Corp.; John J. O'Connell, Consolidated Molded Products Corp.; A. W. Hanmer, Jr., Durez Plastics & Chemicals, Inc.; Spencer E. Palmer, Tennessee Eastman Corp.; and Felix N. Williams, Plastics Div., Monsanto Chemical Co.

Election of officers and directors of the S.P.I. took place at the Annual Business Meeting. This meeting, presided over by William T. Cruse, executive vice-president of S.P.I., was held during the S.P.I. Annual Conference, Edgewater Beach Hotel, Chicago, Ill., May 26-27.

Alloy steels have increased the cost of hobbed cavities, but when a cavity lends itself to hobbing, that is the most economical way to make it. Modern alloy steel hobbed cavities are long running and relatively free from trouble.

"Beryllium Copper Mold Components"

A discussion of the properties and economies of beryllium copper cavities was handled by John Press, Federal Tool Corp., who stated that a properly treated part in beryllium copper is as strong as a part made from most generally used steels. Machinability is about the same as that of tool steel or hobbed cavity alloy steel. Hardening is simple; cavities are heated and then quenched in water or light oil.

As to life of mold, at least 400,000 shots have been made from one pressure cast beryllium copper mold,

KIVETT
Active sales, or else we close up

TETZLAFF
New outlets for acrylic in signs

said Mr. Press, and another has run 1½ million shots with no signs of wear.

Raw materials of beryllium copper cost $1.00 per lb. compared with $.50 per lb. for tool steel. So if the part is simple to machine or hob in alloy steel, don't use beryllium copper. But for small items with fancy detail, this material will be more economical.

FABRICATORS DIV.

HOW the fabricating phase of the plastics industry is meeting the challenge of intensified competition by seeking new and important market outlets was emphasized in the Fabricators Div. meeting. The two speakers—Homer Benson, Regal Plastic Co., and F. W. Tetzlaff, Rohm & Haas Co.—pointed the way to significant new fields of development for the fabricator and highlighted the need for adequate sales representation if full potentialities are to be attained. Chairman of the meeting was Monroe L. Dinell, president, Clover Box & Mfg. Co., Inc.

"Importance of Adequate Sales Representation for Fabricators"

"This subject can be settled without argument by stating that either we have active sales representation, or else we close up," said Mr. Benson bluntly, quoting from a paper prepared by his associate, Jerome S. Kivett.

"Most of us in the industry lose sight of the fact that, to most people, plastics are an unknown entity. They are interested and welcome the opportunity of working with people who will enlighten them on how they might employ plastics to their advantage, both in production items and in sales promotion."

"New Designs in Signs with Acrylics"

The paper presented by Mr. Tetzlaff carried important implications for many fabricators in that it showed how large outdoor signs are opening up an important new outlet for fabricated acrylics.

Early work was with the large oil companies, which offered a good volume potential because of the many service stations in all parts of the country. These installations "broke the ice" for custom applications on a more localized scale.

EXTRUDERS DIV.

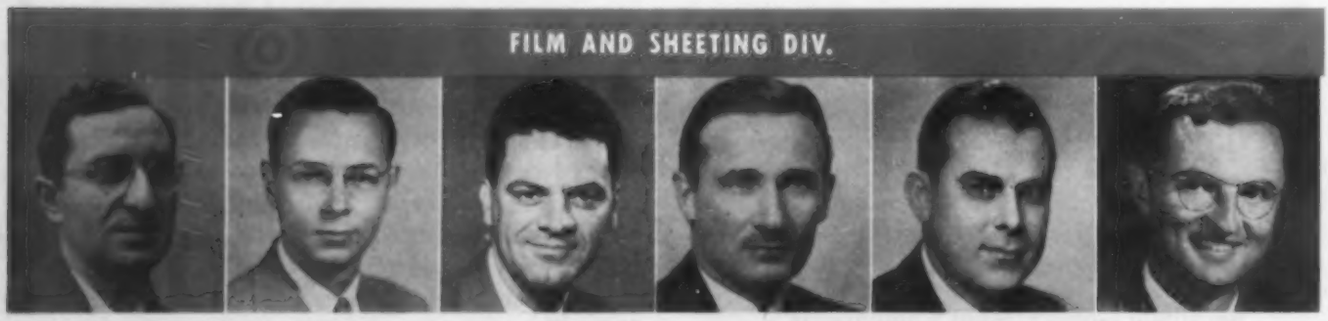
AFTER opening remarks by C. N. Sprankle, Sandee Mfg. Co., chairman of the Extruders Div. meeting, the proceedings were turned over to C. P. Fortner, E. I. du Pont de Nemours & Co., Inc.

"Extrusion of Nylon"

Nylon for extrusion is furnished in scores of variants, said Mr. Fortner. Nylon is used primarily in applications where toughness, abrasion resistance, and ability to withstand high temperatures are required. Extruded strip is used for punching out washers, gears, and other mechanical parts. Tubing is used in medical work where sterilization is essential. Rod stock is used for insulating screws and pins in belt lacing. A use now developing is that of jacketing steel strips for corsets and sometimes as a shaped unsupported stiffener for garments where the stiffness of steel is not needed. Wire coating is a big field for nylon.

"Economics of Compounding and Extruding on a Single Machine"

An extrusion-compounding machine that will take in virgin material and plasticize, compound, color, and extrude it (if desired) in one operation was described by Louis W. Street, Welding Engineers, Inc. The purpose is to provide a machine that will



GOLDMAN
Report on test methods for film

SEGNER
150,000,000 yards of film

REINHART
Importance of specifications

PRICE
New ideas will stimulate sales

MAGID
Retailers need more knowledge

PLUMB
"Quality" needs measuring stick

eliminate many of the steps necessary in compounding various thermoplastic materials and will be particularly adaptable in molding or extrusion plants where the operator now purchases either large quantities of compounded material or must go through several operations such as pre-blending and Banbury mixing to produce his own compounds. The machine looks like an extruder with two parallel worms. A full description was given in the June, 1949, issue of MODERN PLASTICS, page 87.

INFORMATIVE LABELING

THE formal presentation of the S.P.I. informative labeling plan, the result of many months of work by various committees, was made at the May 26th luncheon at which Neil O. Broderson, president, Rochester Button Company, and former chairman of the board of S.P.I. presided.

The plan, as presented by committee chairman Elmer French, Firestone Plastics Company, marks the first long step in industry cooperation for better merchandising and is so designed that every company in the industry can make immediate use of it.

"Put Your Supplier's Dollars to Work for You"

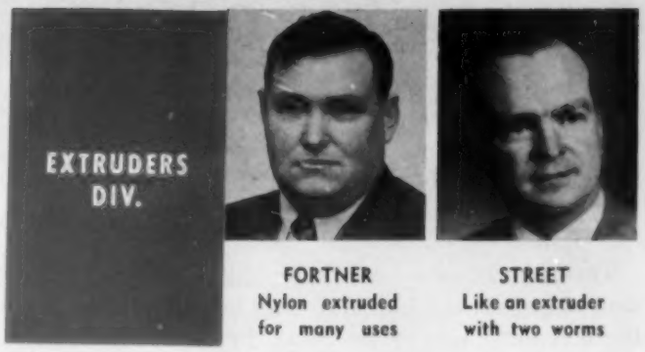
More effective use by molders, fabricators, and processors of the promotion money being spent by material suppliers was urged in a dramatic presentation by Donald Gibb, sales manager, Plastics Div., The Dow Chemical Co., W. R. Dixon, assistant manager, and Amos Ruddock, merchandising section. A study of this presentation appeared on pages 70 and 71 of the June issue of MODERN PLASTICS.

FILM AND SHEETING DIV.

PRESIDING at the Film and Sheeting Div. meeting, Frank J. Groten, Firestone Plastics technical director, prefaced the six papers on the program by quoting the review on vinyl film published in the January, 1949, issue of MODERN PLASTICS. He emphasized that in this branch of the industry, which has become a 40,000,000-lb. per year volume consumer in a relatively short period, technical evaluation and development of standards have not caught up with production. The Vinyl Film Processors Group has been organized to prepare commercial standards which will be reviewed and issued in cooperation with the U. S. Department of Commerce.

"Report on Film and Sheeting Activity"

The activities of the 10 sub-committees of the division set up to work on testing methods for film and sheeting was reported on by Meyer Goldman, The Visking Corp. In accordance with a working agreement with A.S.T.M. Committee D-20 on Plastics, recommendations for methods of test for tensile properties and tear resistance have been reviewed, revised, and published by the American Society for Testing Materials with a by-line indicating the joint sponsorship and assistance of the Society of the Plastics Industry in their preparation.



FORTNER
Nylon extruded for many uses

STREET
Like an extruder with two worms

"Styling Trends and Potentials in the Vinyl Film Industry"

In a paper presented by J. R. Price of the Bakelite Corp., the following trends were indicated:

New ideas in color and surface effects will continue to stimulate sales. Metallic colors and textiled surfaces to simulate moire, taffeta, lace, etc., are examples but the textilized surfaces are higher in cost and have been slow catching on.

Rainwear has changed from 90% clear film a few years ago to almost 90% color today.

Styling has taken increased advantage of the colors possible with vinyl. Out of 60% material not compounded with colorants, 80% receives color with roller or screen treatment.

A less volatile or emulsion type ink is now being developed for vinyl printing that will eliminate many of the hazards created by use of solvents.

Draperies in 4-mil film, inexpensively marketed to sell for from $1.79 to $3.95, will find increasingly wide acceptance.

"Importance of Product Evaluation"

The importance of product evaluation in an industry which made 150,000,000 yards of film (4 mils or less in thickness) and 50,000,000 yards of sheeting

GIBB DIXON RUDDOCK
More effective use of supplier's promotion dollars

in 1948 was discussed by C. D. Segner, B. F. Goodrich Chemical Co. His analysis included investigation of the service requirements of the product when used by the ultimate consumer and consideration of the conditions to be encountered when the article travels from its birthplace to its final home.

"The Importance of Specifications"

The significance of specifications to the resin manufacturer, the film and sheet manufacturer, and the converter was reviewed by Frank W. Reinhart, National Bureau of Standards. He warned against expecting ever to produce a perfect specification because the perfect product itself is unlikely to be achieved.

A recent publication of the American Standards Association entitled "What Good Are Standards?" was referred to by Mr. Reinhart as an excellent source of factual information on this subject.

"What the Retailer Expects from Vinyl Film Fabricators"

Robert P. Magid, Hartford Textile Corp., pointed out that all vinyl producers from the resin manufacturer to the fabricator must work more closely with the retailer. Today the retailer doesn't have enough knowledge about this new material to help him move it effectively into the consumers' hands. It is the retailer who must be the manufacturers' agent in telling the customer what this product will do and how to take care of it. Mr. Magid thinks informative labeling that tells what a product *will not* do as well as what it *will* do will prevent overselling by the retail clerk.

"Trends in the Vinyl Industry"

David S. Plumb, Monsanto Chemical Co., covered the growth of the film and sheeting industry and called particular attention to the fact that this very growth has increased the chaotic condition in the industry. The retail store buyer and even the consumer have become accustomed to determining the quality of a fabric by its appearance and feel. But if a film is free from surface defects and has a pleasing hand, there is little that even an expert can determine about its quality without laboratory tests. As a result, some film of questionable quality has reached the consumer. Mr. Plumb believes that efforts by the various interested groups to form quality standards or measuring sticks may go a long way toward solving this vexing problem.

ACCOUNTING AND FINANCIAL DIV.

THE conference session of the Accounting and Financial Div. was conducted by E. H. Gabel, General Electric Co. Key financial factors for successfully operating a plastics plant constituted the theme of the meeting.

"Incentive Pay for Supervisors"

Monroe Smith, Plastic Manufacturers, Inc., outlined the means by which incentive pay for supervisors is established in relation to the performance of an individual or a group of individuals. In establishing such a plan, he warned, all available technical and engineering ability should be utilized, together with a sympathetic attitude toward the human elements involved.

S.P.I. Uniform Accounting Manual

Mr. Gabel discussed the S.P.I. uniform accounting manual and its use as a tool by management for optimum results. It was pointed out that the S.P.I. Uniform Accounting Manual, the result of many months of effort by industry members, is now available to all member companies. Mr. Gabel described it as "a dynamic, living, changing tool of management for the plastics industry," the value of which will depend on how skillfully it is used.

"Accounting Department Reports to Assure Prompt Managerial Correction of Unprofitable Operations"

William H. Nussbaum, Columbia Protektosite Co., declared that it was the duty of the accounting department to detect the underlying causes of unprofitable operations and bring them to the attention of management.

"Recent Transportation Rate Trends"

Concluding the Accounting and Financial Div. session, B. A. Butryman, Colt's Manufacturing Co., pointed out that rate trends are still upward and called attention to current developments which may affect producers of plastic products.

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The concluding feature of the 1949 Spring Conference was the social hour and annual banquet on May 27, with George H. Clark, The Formica Co., retiring president, S.P.I., serving as toastmaster.

The annual Pioneers Reception and Dinner was held on May 26, with 52 industry veterans in attendance.

Valve Sprays Liquids Under Pressure

Polyethylene nozzles are molded in various colors, one for each different type of product

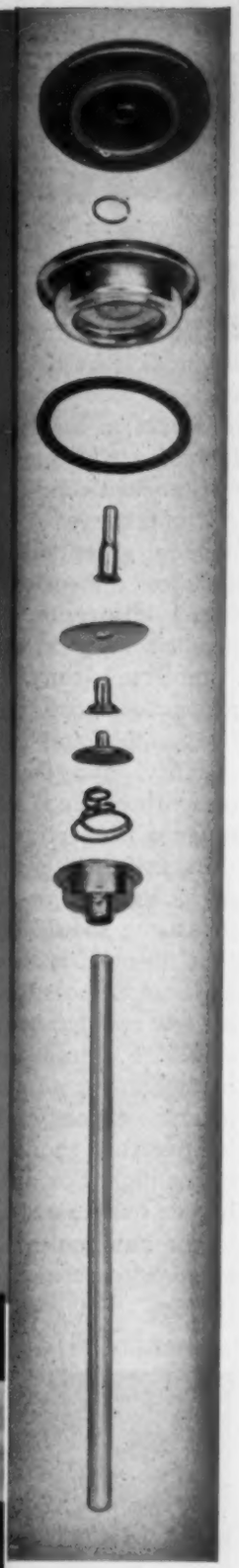
POLYETHYLENE and nylon parts are used in the dispenser mechanism of a new type spray package adopted for a number of products made by the Bridgeport Brass Co., Bridgeport, Conn. The products include an insecticide, a space deodorant, and an acrylic-based clear glossy surface protective coating.

The products are packaged in steel Crown Cans by being combined with Freon gas which is liquefied before packaging so that the solution is under pressure when it returns to room temperature, and will come out in a fine spray when the valve on the package is opened. The valve is operated by exerting thumb pressure on the rear of the molded polyethylene nozzle. The nozzle has a hole on its underside which fits over a metal tube which projects about ½ in. above the mouth of the can. This tube has some play in it and only has to be pushed about 1/16 in. off center to open the valve.

The entire dispenser assembly consists of 11 parts; the polyethylene nozzle, a nylon washer, an extruded polyethylene standpipe, a rubber cap seal, and seven metal parts.

The Bakelite polyethylene nozzle is molded by Bridgeport Moulded Products, Inc., Fairfield, Conn., in a 32-cavity die with hydraulic side pulls to mold the horizontal meeting hole out of which the spray is dispensed. A brass ferrule is inserted in this hole during assembly of the dispenser. The nozzle is molded in the natural color and in black, red, and green—a different color for each product.

The polyethylene standpipe is extruded by New England Tape Co., Hudson, Mass. It is a thick-walled tube with an inside diameter of 1/16 in. and an outside diameter of 3/16 inch. The nylon washer, which acts as a seat for the valve closure, is stamped from sheet material 1/32 in. thick.



Dispenser assembly has polyethylene nozzle and standpipe, and a nylon washer

Acrylic-based protective coating is packaged in spray dispenser container

New Styrene-Base Molding Material

A STYRENE-base copolymer thermoplastic molding material with an impact strength in the high cellulosic range was introduced late in May by Rohm & Haas Co., Philadelphia, Pa. The new general purpose powder, designated Plexene TA, is available in black and a variety of opaque colors including white and colors matched to the Bureau of Standard's industry standards.

Properties of moldings made from the material include exceptionally high impact strength, outstanding dimensional stability resulting from low water absorption and the complete absence of plasticizers, good chemical properties including resistance to battery acids and gasoline, good electrical properties, good moldability because of low flow temperature and little plasticity variation, good heat stability, and ease of finishing, machining, and cementing. The table on the opposite page shows the range of properties.

In injection molding, it is recommended that pressures be high and dies hot (130 to 170° F.); the press ram should be forward about 2/3 of the total time the mold is closed. Gates and runners should be as large as possible and molds should be designed for few restrictions on flow. A cylinder temperature of 425° F. is recommended as a good starting point in molding a normal job that is less than 80% of machine capacity. If flashing should occur, cylinder temperature should be dropped while pressure remains high. For difficult flow or welding conditions, higher temperatures may be necessary.

The new material is reported to handle easily in standard extrusion equipment. Dies should be kept cool (about 200° F.) for best surface finishes and cylinders operated at 350° F. The surface of Plexene TA extrusions usually approximates a matte finish and high gloss is produced by buffing or solvent polishing.

The material can be compression molded in either positive or semi-positive molds. For simple moldings, temperatures can be as low as 280° F. with pressures of about 1000 p.s.i.; for increased flow of material, both these figures may be increased. Surface sticking in compression molding of Plexene TA can be avoided by using mold release agents or by preheating the material for about 15 min. at 280° F., thereby shortening the press cycle.

Due to the combination of toughness and surface hardness, parts molded of this material are described as being easily sheared, planed, milled, punched, sawed, drilled, sanded, and buffed. Finished parts can be cemented by standard techniques used for cellulosics. Methyl ethyl ketone is recommended, but acetone and ethylene dichloride can be used satisfactorily. A short soaking time of up to 15 sec. produces a "cushion" which improves the register of opposing surfaces being cemented.

The combination of properties and the price of the material—ranging in black from 54¢ per lb. for 20,000 lb. and over, to 65¢ per lb. for less than 200 lb., and in other opaque colors from 55¢ per lb. to 70¢ per lb.—lead its makers to suggest its application in battery parts and cases; tool and cutlery handles; housings for business machines, electrical appliances, cameras, radios, and flashlights; and pens and pencils, telephone handset cradles, goggle

COURTESY ROHM & HAAS CO.

High-speed photography dramatizes excellent impact strength of a cylinder molded of the new styrene-base thermoplastic material described in the accompanying article. A chart of preliminary physical properties of the material is presented on the opposite page

frames, bottle caps, combs, freezer lids, and photographic film holders.

Because of its strength in thin sections, study is being given to the possibilities of Plexene TA in molded luggage, trays of all kinds, and industrial tote boxes and baskets. Its chemical resistance, according to the manufacturer, will make it useful in industrial applications.

The general purpose powder, Plexene TA, is one of several possible variations of a basic styrene copolymer high impact formulation known as Plexene T. Where a specific application calls for properties not found in the general purpose material, it is possible by modifying the basic formulation to alter the properties so that the requirements of the job may be met.

Preliminary Physical Properties, Plexene TA Black

Properties	*Test methods*	*Test conditions*	*Average values*
Specific gravity	A.S.T.M. D-785-44T		1.06
Tensile strength	A.S.T.M. D-638-44T	¼-in. max.	6,100 p.s.i.
		¼-in. rupture	4,700 p.s.i.
		Elongation at break	25% ± 10%
Flexural strength	A.S.T.M. D-650-42T	Max. (no break)	9,600 p.s.i.
		Deflection	>1.0 in.
Compressive strength	A.S.T.M. D-695-44T		7,800 p.s.i.
Impact strength	A.S.T.M. D-256-45T	Izod notched	5.0 ft.lb./in. notch
Heat distortion temperature	A.S.T.M. D-648-45-T (Type S Conditioning)	½° C./min.-264 p.s.i.	79° C. (174° F.)
		2° C./min.-264 p.s.i.	84° C. (183° F.)
Flow temperature	A.S.T.M. D-569-43		141 ± 5° C. (286 ± 9° F.)
Mold shrinkage		Cold mold to cold piece	0.003-0.005 in./in.
Rockwell hardness			L-65; R-105
Dielectric strength at 25° C. (77° F.)	A.S.T.M. D-149-40T	Short time test	>400 volts/mil
Dielectric constant at 25° C. (77° F.)	A.S.T.M. D-150-47T	60 cycles bridge method	4.5
		1,000 " " "	4.3
		1,000,000 cycles	3.7
50% RH		Susceptance method	
Power factor at 25° C. (77° F.)	A.S.T.M. D-150-47T	60 cycles bridge method	0.015
		1,000 " " "	0.08
Arc resistance	A.S.T.M. D-495-42		110 sec.
Flammability	A.S.T.M. D-635-44	¼-in. thickness	0.8 in./min.
Odor			None
Water absorption	A.S.T.M. D-570-42	Weight loss on drying	0.2%
		Weight gain on immersion	0.3%
		Soluble matter lost	None
		Water absorbed	0.3%
		Dim. change on immersion	None
Resistance to chemical reagents	A.S.T.M. D-543-41T		

Percent weight change after 7 days immersion at 25° C. (77° F.) in:
(a change in weight of 1% or less is considered negligible)

	Change		*Change*		*Change*
Sulfuric acid 30%	0.2%	Sodium hydroxide 1%	0.4%	Ethyl alcohol 95%	1.1%
Sulfuric acid 3%	0.4%	Ammonium hydroxide 10%	0.6%	Gasoline	1.1%
Nitric acid 10%	0.4%	Sodium carbonate 2%	0.4%	Acetone	Dissolved
Hydrochloric acid 10%	0.3%	Sodium chloride 10%	0.3%	Ethyl acetate	Dissolved
Acetic acid 5%	0.4%	Hydrogen peroxide 3%	0.4%	Ethylene dichloride	Dissolved
Oleic acid	—0.003%	Distilled water	0.4%	Carbon tetrachloride	Dissolved
Sodium hydroxide 10%	0.3%	Ethyl alcohol 50%	0.5%	Toluene	Dissolved

Who Uses Vinyl Film?

COURTESY FIRESTONE PLASTICS CO.

Decorator-styled ready-made drapes or drapery yard goods open new outlets for vinyl, can be used anywhere in home

(First of a series of articles on vinyl film, sheet, and coatings.)

WHO buys and uses vinyl film? Between 15,000,000 and 20,000,000 yd. of vinyl film are produced in this country every month for uses customarily associated with fabrics, according to one of the largest producers. The term "vinyl film" in this sense means material 10 mils and under in thickness, and exclusive of film used in packaging. It is generally calendered although cast film is beginning to appear in increasingly greater proportions for use in this field.

Film is sold in rolls as it is produced. It may then be converted into yard goods to be sold at retail, or it may go to fabricators who make it up into scores of different items for sale to the ultimate consumer. The pattern for this middle ground, where vinyl film is handled before it reaches the retail store counter, is somewhat different from that found in other branches of the plastics industry. It is closely akin to the manufacturer-processor-distributor set-up in the textile industry and emphasizes the marriage of textiles to chemistry that took place when synthetic fibers moved into the fabric picture some 25 or more years ago.

The possibilities of this vinyl film field seem infinite. As yet, however, there has been no gigantic promotional work; there is only small scale distribution in the West and South; small towns and cities in many parts of the country are still comparative strangers to vinyl film; only a few of the possible applications in the home have been exploited. In spite of these factors, consumption continues to grow month by month.

The vinyl film industry has suffered in other respects as well. In the first place, it was confronted with a great problem when there was not enough suitable plasticizer to produce satisfactory film. The result was the production of all sorts of inferior items which were seized upon by men who were for getting all the dollars they could while the getting was good. That situation should clear up now that suitable plasticizers are available. Furthermore, the small operators who looked upon the production of this tempting material—a material that could be purchased in great quantities at as low as 16¢ a yd. and sold in competition with higher cost fabrics—soon learned that a small fortune in capital equipment was required in order to turn out a satisfactory material. Not many such operators are left in actual film production, but there are still scores of them endeavoring to make hay as fabricators of curtains, drapes, table covers, etc.

Who manufactures film

The line of operation in vinyl film starts with the production of the film itself. Manufacturers of film have evolved from chemical companies, rubber processors, pyroxylin coaters, textile converters, and a few who started from scratch. From here on, there is no clear line of demarcation in the industry as to who does what. There are converters, fabricators, distributors, cutters, and printers, with much overlapping of duties performed by each. Before investigating these various categories, it would be well to study the position of the various resin companies, some of whom are in this business from "cradle to grave."

The Bakelite Corp., a unit of Union Carbide Co., manufactures resin and compounds. Carbide & Carbon, another unit of Union Carbide, produces plasticizers and stabilizers. Each unit is a separate entity. The Bakelite unit is the largest volume producer of film in the United States at its Bound Brook, N. J., and Ottawa, Ill., plants. It is esti-

COURTESY I. B. KLEINERT RUBBER CO.

Durability and ease of cleaning make vinyl rate high in the nursery for quilted high chair pads, baby pants, and so on

mated that 40% of all the film produced in the United States comes from these two plants. Bakelite sells Vinylite film directly to fabricators and converters and also through a distributor. In addition, another unit of Union Carbide Co., National Carbon, calenders film at Bennington, Vt., and markets it under the trade name Krene. Such film is generally printed by the Decora Co. at Ft. Edward, N. Y., and fabricated into finished products at the Bennington plant. The fabricators of these films then sell directly to retail outlets or sometimes to jobbers.

B. F. Goodrich Chemical Co., Cleveland, Ohio, is the producer of Geon polyvinyl resins, plastic compounds, and latices, in addition to two plasticizers, including Hycar nitrile-type rubber. Most film producers using Geon resins are promoting their own trade names, and many of these are well recognized in mail order and retail trade outlets. The B. F. Goodrich Co., the parent company, produces many vinyl products under the trade name Koroseal. Film and sheeting are the biggest items in the Koroseal line and are manufactured at Marietta, Ohio. The sole distributor for Koroseal film is Comprehensive Fabrics, New York, N. Y. A good portion of the film is printed by Hicks & Otis, Inc., Norwalk, Conn., and sold to fabricators.

The Glenn L. Martin Co., Baltimore, Md., manufactures Marvinol vinyl resin only and has no connection with any company producing vinyl film.

The Firestone Plastics Co. now makes its own resin. Estimators say that Firestone is the second or third largest producer of film. Manufactured at the plant in Pottstown, Pa., and marketed under the name Velon, either unprinted or embossed film is sold directly to converters or fabricators. For yard goods sales in retail stores or to fabricators, the printed film is distributed by Hartford Textile Corp., New York, N. Y., which markets it as Beutafilm.

Goodyear Tire & Rubber Co., Akron, Ohio, manufactures its own resin which is used largely in production of its own Pliovic vinyl products. The company has recently announced that Velveray Corp., New York, N. Y., an old-time fabric printer and one of the first to print on vinyl, would become its converter and national distributor.

Monsanto Chemical Co., Springfield, Mass., has been producing and selling Ultron vinyl resin for several months and is now producing film in all colors, including metallic shades. Its converting and distribution plans have not been announced.

Similarity to textile industry

All the vinyl resin producers and their parts in the film structure are taken care of above.

The balance of the field breaks up into various categories that are similar to classifications in the textile industry. At the top are former textile, rubber processing, and pyroxylin coating firms now calendering vinyl film. To show the extent of the textile operators' invasion of this 4-mil vinyl film field, it is pertinent to point out that two of them, Harte & Co., Inc., New York, N. Y., and Presto

Who Does What?

The whole subject of vinyl film, from raw material to the ultimate consumer, is admittedly complex. And the terms generally applied by the industry to those who handle film in its various stages do not help to simplify matters. The following glossary is offered for those readers of the accompanying article who are not familiar with the terminology of this branch of the vinyl industry.

Producer: A manufacturer of vinyl resin or vinyl film.

Fabricator: A manufacturer who works up vinyl film into finished products for the trade.

Processor: A manufacturer in any category except the producer of resin.

Distributor: A selling agent for finished items.

Converter: A purchaser of vinyl film who prints it with his own patterns and sells to fabricators. Sometimes his printing is done by contractors.

Cutter: Synonomous with fabricator.

Printer: A contractor who prints vinyl film.

Converted film: Film that has been embossed or printed.

COURTESY FIRESTONE PLASTICS CO.

Vinyl tablecloths, produced in smart patterns and bright colors, make light of spilled milk, eliminate laundering

Plastic Products Co., Inc., (founded by J. P. Frank and Co., Inc.) also of New York, are reported to be among the five largest producers from a volume standpoint. Closely related are companies like Respro, Inc., of Cranston, R. I., which was primarily interested in pyroxylin coating for the shoe trade up until a few years ago but has now added vinyl film and sheeting to its line and has acquired a reputation for quality control based on its past technical experience. Several former pyroxylin and rubber coaters are in this group, and the majority concentrate on vinyl sheeting or vinyl coated fabric rather than on vinyl film.

Vinyl film manufacturers are primarily concerned with producing and selling film to converters who print or emboss it and, in turn, sell to fabricators or cutters who produce consumer goods. However, several of the film producers or calenderers also do their own printing and sell direct to the fabricator.

The converter is also a processor. In the textile industry he buys cloth and either processes it himself or sends it out to be printed, sized, dyed, treated with resin for shrink proofing, etc. The textile firms who do such processing on contract for converters are called finishers. In the vinyl industry, finishers do only printing and embossing. Consequently, the converter for vinyls buys film, either prints or has it printed from his own designs or patterns, and sells finished yard goods to the fabricator. Such old time textile names as Susquehanna Mills, Toscany, and Cohn-Hall-Marx are prominent in this part of the vinyl film industry.

The converters of vinyl film are, on the whole, all solid and substantial business firms. Most of them are also in some branch of the textile industry. But the vinyl fabricating industry, as distinguished from converters, is a hodgepodge of operators such as has seldom been gathered together in the history of American industry. Many of the get-rich-quick Johnnies, are gone—either broke or seeking other more lucrative fields. But the industry is still alive with small-scale operators who are content to operate in garret, living room, garage, loft, or other cramped quarters with little or no inventory and only a few cutting tools and a sewing machine for equipment.

Home fabricating didn't work

Then comes the slightly larger operator who keeps an employee who can operate a sewing machine, has a small inventory of patterns, and concentrates on one product. Not long ago there was a producer-fabricator who attempted to capitalize on the possibility of fabrication in the home. He sent out his film to various household operators who made it up into curtains, aprons, and the like. But he soon gave up—he lost more than 10% of his material by theft.

Then there is the story of the lady in a small midwestern village who made jeans for children—a small operation. A film salesman stumbled into her store a couple of years ago and persuaded her to try a few yards of film for infants wear. Now she not only sells children's garments, but wants rolls of film to sell as yard goods at retail.

Out of these trials and tribulations, a new industry has been born, with top-notch operators, equipment designed specifically for vinyl film fabrication, and new or enlarged plants to handle an ever-increasing volume of business. The smaller operators will probably always be at hand, just as there are small operators in the plastics molding or textile industry; but many individual vinyl fabricators are now on the way to large-scale operations.

Trend toward exclusive fabrication

Among the fabricators themselves there is a wide range of difference in methods of operation and in end products, but there is a noticeable trend towards exclusive fabrication, or at least major concentration on vinyl film with declining attention given to other materials. The trend is particularly noticeable in plants where oil cloth, pyroxylin coated goods, rubber treated apparel, and certain types of cotton house furnishings or apparel were previously manufactured. Another noticeable trend is the tendency for each processor to branch out to an ever-increasing line of products. Two or three years ago, most of the fabricators were concentrating on one or two items such as shower curtains or aprons. Today there are few of those original shower curtain manufacturers who have not extended their line to include several other items. Shower curtains are no longer the chief outlet for 4-mil film. The

lead appears to have passed to table cloth covers, with low cost window curtains coming up fast. An especially interesting and potentially large volume use now making headway is the growing quantity of window shades being coated with vinyl.

Minimum investment needed

One experienced operator states that a minimum investment of from $12,000 to $15,000, including cost of engraved printing rollers and the design, is necessary for a fabricator to make any kind of a start on a sizeable scale. This investment would include only the goods and design for one item, such as shower curtains. If he spreads out to table cloths, curtains, and other things, he will have to double, triple, or quadruple his investment to cover more inventory and more equipment.

Most good private patterns are printed in at least 100,000 yd. quantities—some have run to 1,000,000. Open patterns—those which printers have in stock—are, of course, much less costly because the fabricator is not investing in printing rolls nor design, but he is also losing the magic word "exclusive" which is a prime factor in fabric merchandising. Labor is not difficult to train, and needle trade workers can usually be shifted to vinyl without much trouble.

Established firms have branched out

An example of what has happened to firms well established in other lines, who started in vinyl fabrication a few years ago and whose vinyl business now is a major part of their enterprise, is Plastron, Inc. This company recently built a new plant in Hackensack, N. J., and furnished it with more than $200,000 worth of equipment, mostly for operation with vinyls. The company was formed by the Arnel Co., which specialized primarily in window shade cloth. Starting with shower curtains, Plastron now has a line of goods including table cloth covers, chair pads, garment bags, yard goods, and other items that require 76 patterns and 400 different colors.

A firm which approached the vinyl field from a different angle is Leonard M. Schur, Inc., New York, N. Y. That company had been doing a modest business in cotton goods and oilcloth for 14 years; now it is doing six times as much business in vinyl as it ever did in fabric. Schur specializes in window drapes and chair cushions, has many other items, such as bed spreads, and recently introduced a new printed pattern that resembles quilting. Unlike many other fabricators, who do a considerable amount of shopping around for their film, this company sticks rather closely to film produced by Resiloid Corp., Brooklyn, N. Y., whose selling agent is Elm Plastics Co. of New York, N. Y.

Still another approach to the vinyl fabricating field is represented by I. B. Kleinert Rubber Co., New York, N. Y., rubber coaters for 77 years. This company now handles more vinyl material than rubber in its coating department. Two years of experience were gained before the war coating rayon and silk, the company has been deep in the vinyl business ever since, with products ranging from infants' wear to dress shields, beach bags, and shower curtains. A great part of Kleinert's fabricating is done with coated goods of thin texture, such as nylon or silk, thus setting the company apart from those who deal entirely in film, but it is also a large-scale purchaser and fabricator of free film. As an indication of the size that may be attained by a fabricator, the Kleinert Co.'s recent annual statement shows a sales volume of over $8,000,000 for each of the last two years.

These three companies were picked at random from scores of fabricators in the New York City area who produce a limitless array of materials; their briefly sketched histories are presented simply to point out that almost any three companies in this business may show quite different origins and specialize in different products, yet all concentrate heavily on vinyl film.

Most of the larger operators feel that the industry is still in its infancy, although some confess that the infant isn't being handled too well by a few of their colleagues who produce poor quality goods, inferior styling, and sloppy finishing. Generally speaking, however, there is a well-grounded belief that early mistakes will be rectified, just as they have been in many other new industries and that the vinyl film fabricating industry is headed for a highly respectable and at least moderately profitable position in the family of American businesses.

NEXT MONTH: *A view of activities in vinyl film fabricating plants.*

Wider selection of high-grade vinyl shower curtains brightens up bathrooms, promotes the popular spick and span look

COURTESY PLASTRON, INC.

One-Piece Cabinet

New one-piece phenolic television console cabinet is examined by Dom Siragusa, president of Molded Products Corp. (left) and Ross Siragusa, president of Admiral Corp.

THE trend towards larger compression molded pieces noted in these pages two months ago[1] is fast gathering speed. Not long ago the largest compression molded piece in production in this country weighed about 22 pounds. Now there is a console cabinet television set on the market with a one-piece phenolic cabinet which weighs 35 pounds.

Largely because of the economic advantages of the phenolic cabinet as compared with a wooden cabinet, the 24-tube, 10-in. screen set retails for $249.95, which the manufacturer claims is $100 less than any comparable set. The cabinet was developed jointly by Admiral Corp., Chicago, Ill., manufacturer of the television set, and Molded Products Corp., Chicago, the molder.

Several general purpose phenolic materials[2] are used to mold the cabinet, which is 32 in. high, 16¾ in. wide, and 18 in. deep. The phenolic cabinet is molded on a 2000-ton press which was originally built by Bethlehem Steel for drawing large shell casings.

The press was intended for the Russian government, but was delivered instead to the United States government. It produced shell casings at Blairsville, Pa., for two years before it was sold as surplus. The press weighs 250,000 lb. and is so large that the roof of the Molded Products Corp. plant had to be torn open to get it in. After installation, the press pro-

1 "New Markets Demand Larger Pieces," MODERN PLASTICS *26*, 55 (May 1949).
2 Supplied by Bakelite Corp., Durez Plastics & Chemicals Inc., Monsanto Chemical Co., and Plastics Engineering Co., Inc.

The lower half of the mold's force plug has raised grilled shaped sections which mold diamond shaped openings for set's loud speaker

When the mold components at center and right below are assembled in the press, they form the cavity of the mold. The force plug assembly on its steam platen is at left

Weighs 35 Pounds

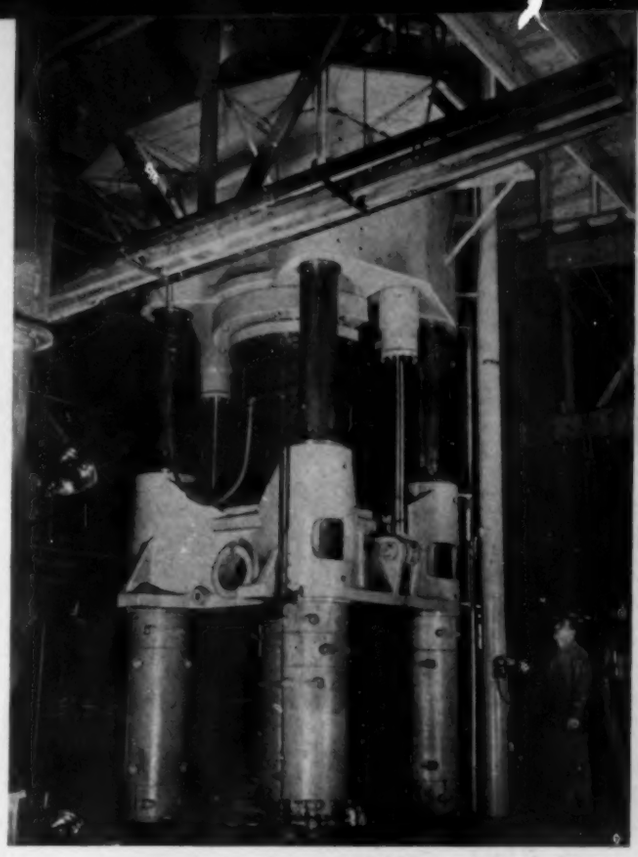
jected through the roof and a "penthouse" had to be erected to shelter it.

The mold for the job was designed and built by Molded Products Corp. It consists of seven main sections with a total weight of 16,000 pounds.

The molding powder is placed in the mold in the form of bricks which have been electronically preheated. An R.C.A. 15 kilowatt preheater raises the temperature of the bricks to 250° F. in 1 minute. The molder estimates that the cabinet would have required a 20-min. molding cycle and 4000 tons of pressure if the material had not been preheated. The electronically preheated material requires only 2000 tons of pressure and a total molding cycle of 6 min., including closing time, curing time, and opening time.

Only two men are needed to operate the press, and they can turn out 10 cabinets an hour. This is far more than could be produced by dozens of men working on a slow-moving assembly line to produce wooden cabinets.

In addition to the price advantage of the phenolic cabinet, it has other advantages over wood—its resistance to scratching, to cigarette burns, to alcohol —which Admiral is using in its advertising as selling points.



Huge 2000-ton hydraulic press, originally built for drawing shell casings, it used to produce television cabinet

Cabinets come from the big molding press at the rate of 10 per hr., ready for assembly with the television components

Molding cycle is cut to 6 min. by electronically preheating bricks of phenolic molding material to 250° F.

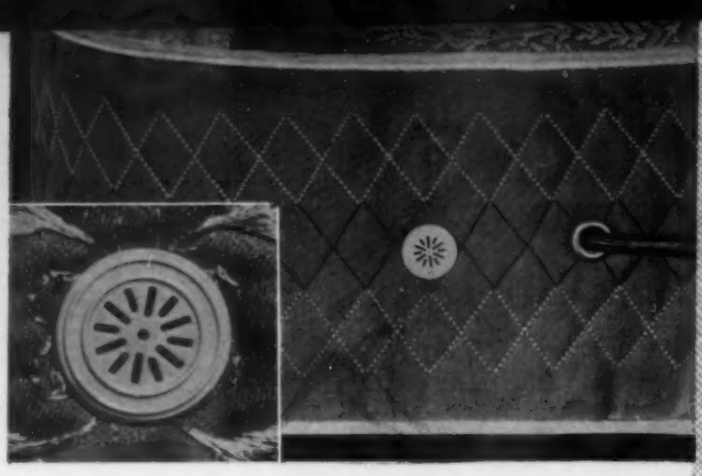
Attractive, durable cutlery handles which can withstand near-boiling water are injection molded of Plexene M modified polystyrene. The handles are molded on the cutlery tangs. St. Clair Plastics, Inc., 16th St. & Sixth Ave., Waterveliet, N. Y., molds these one-piece handles for Kaylan Cutlery Co., 237 Wolf St., Syracuse, N. Y.

Helmet of hair dryer for home use is fabricated of Beutafilm vinyl; blower unit has molded phenolic housing. Blower keeps warm air (about 140° F.) flowing into helmet, which allows air to circulate around hair but keeps heat from dissipating. Sky Products Co., 5405 Ballard Ave., Seattle 7, Wash., makes the helmet and markets the unit. Blower, which can be used without helmet as a portable dryer, weighs 2 lb. 6 oz. and is made by Wahl Clipper Corp., Sterling, Ill.

PLASTICS

Electronically operated metronome is equipped with flashing light as well as an audible signal. Housing is molded of brown Lustrex polystyrene by Connecticut Plastic Products, Inc., 70 West Liberty St., Hartford, Conn. The unit, called the Metronoma, is made by Crystal Research Laboratories, Inc., 29 Allyn St., Hartford, Conn.

Coat hanger molded of Lustrex polystyrene is convenient for travelers to use because it folds for compact storage in suitcases. Hanger is molded by H. Jamison, 71 Sunrise Highway East, Freeport, N. Y., for Kingly Plastic Products Corp., 11 West 42 St., New York, N. Y.

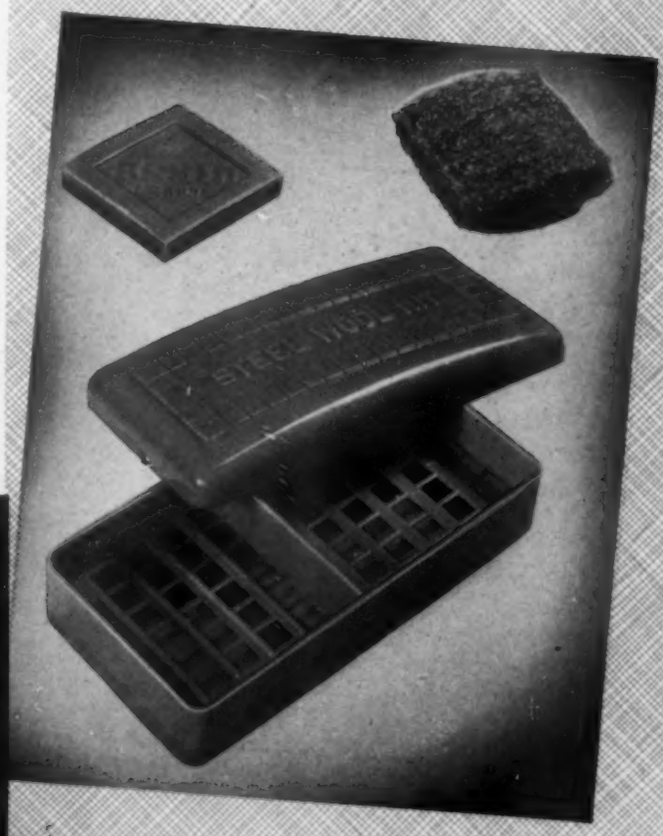


Mattress ventilators, formerly made of metal, are now molded of polystyrene. Each ventilator is molded in one piece with 13 holes molded in. It is held by a pronged metal ring inside the mattress which grips a tube-like projection of the ventilator. Molded of clear or colored material by Minnesota Plastics Corp., 366 Wacouta St., St. Paul, Minn., for Bechik Products, 780 University Ave., St. Paul

New Zenith television set has speaker grille made up of strips of Tenite II cellulose acetate butyrate woven horizontally through vertical wooden rods. These easy-to-clean ½-in. wide translucent tan butyrate strips are extruded by Perfex Plastics, Inc., 4384 South Wentworth Ave., Chicago, and Anesite Co., 1959 Fulton St., Chicago

PRODUCTS

Steel wool and soap will not become soggy when they are kept in this polystyrene kit. Kit is divided into two compartments by polystyrene grating which keeps wool and soap high and dry. Grating lifts out for easy cleaning. Box, which is 5¾ by 3 by 1½ in., is molded in variety of colors by F. J. Kirk Molding Co., Brook St., Clinton, Mass., for Kitco Products Co., 237 Jericho Turnpike, Floral Park, N. J.



Buttons, needles, pins, and 18 spools of thread can be kept neatly arranged and accessible on the Merry Wheel, which works like a Ferris wheel. Wheel and stand are molded of pink, blue, or ivory Styron polystyrene; trays are transparent polystyrene. Injection molded by Consolidated Plastics Co., Los Angeles, and distributed by Westcraft Plastics Products Co., 1004 Folsom St., San Francisco

Cotton knit one-piece creepers for toddlers have built-in moisture proofing. The garments are lined with light weight, waterproof, stain-resistant Vinylite film. The creepers are available in two styles, flat-opening or shoulder button, and in solid blue, maize, or white. Manufactured by Miller Art Mfg. Co., 1370 Broadway, New York 18, N. Y.

Household oilers have bodies molded of transparent Tenite cellulose acetate. The bodies are crimped onto tinned steel bases in a leak-proof assembly, and threaded at the neck to receive metal spouts. The oilers, called Scan-Cans, are made in ½ and 1½-oz. sizes and in four transparent colors. Acetate bodies molded by Wheeling Stamping Co., Wheeling, W. Va., for Eagle Mfg. Co., Wellsburg, W. Va.

PLASTICS

Toy pump is only about 3 in. tall, but will actually pump water. The well proper, the well cover, the pump handle, and spout are all molded of polystyrene. Well sides are molded to look like clapboard. Made by Ideal Novelty & Toy Co., Hollis, N. Y., in a variety of colors

A power tool and all its accessories are readily accessible and can be conveniently carried in this light weight, sturdy kit molded of Lustrex polystyrene. A special compartment is molded-in to hold each item in the set securely in place. The plastic kit is molded and sold by Casco Products Corp., 512 Hancock St., Bridgeport, Conn.

Anyone who marks paper bags, metal cans, china, or any slick surface can make good use of a new mechanical marking pencil from which the crayon is fed as the point wears. Barrel and cap of the pencil are molded of Forticel cellulose propionate. Pencil is manufactured by the Listo Pencil Corp., 2406 Eagle Ave., Alameda, Calif.

Pin-up lamp and various types of desk lamps have shades, bases, and ink well tops molded of pink, blue, green, ivory, or walnut Beetle urea. Pens and pen holders are molded of black cellulose acetate. Made by Atlas Consolidated Corp., 298 Junius St., Brooklyn, N. Y.

PRODUCTS

The corsage life of orchids and other flowers can be lengthened by using the Corsage Preserver, an orchid-colored transparent vase which can be built into corsages. The tapered tube, molded of Tenite cellulose acetate, has a rubber cap to prevent leakage. The tube can be dipped in hot water and bent to desired shape. Molded by the Creative Plastics Corp., 527 Nostrand Ave., Brooklyn, N. Y.

Economical, light weight, colorful mugs for cold drinks are molded of Lustrex polystyrene. The mugs are available in 10 and 14-oz. sizes in crystal, amber, red, blue, green, or yellow. Manufactured by Plaskel Products Co., 1700 Plantation Rd., Dallas, Texas

delivery?

AT MIDLAND IT'S FASTER THAN A CAT CAN HAVE KITTENS!

This wall socket hobbed cavity by Midland incorporates two narrow "T" projections raised 3/16 inches above the cavity surface. By using hobbed cavities of this type in place of the conventional insert cavities, all unsightly parting lines were eliminated and in addition to improving appearance, the hobbing was accomplished at only a fraction of the cost of cavity duplication by machining methods.

Yes, actually! It takes a cat nine weeks—and on most hobbed cavity jobs we do a *lot* better than that! Our skilled craftsmen, our machining, engraving and hobbing equipment are working constantly, accurately on a schedule that means delivery of hobbed cavities in a matter of weeks —not months. Whenever you order from Midland you are assured the kind of accurate, uniform, perfectly finished hobbed cavities that only skill and experience can provide.

So if limited molding capacity and long quoted delivery are holding you back, grab the problem by its neck and bring it to Midland where delivery is shaved to a cat's whisker.

For a clear picture of our equipment and our know-how, write for a copy of "Shaping Tomorrow Today." Better still, send your blueprints!

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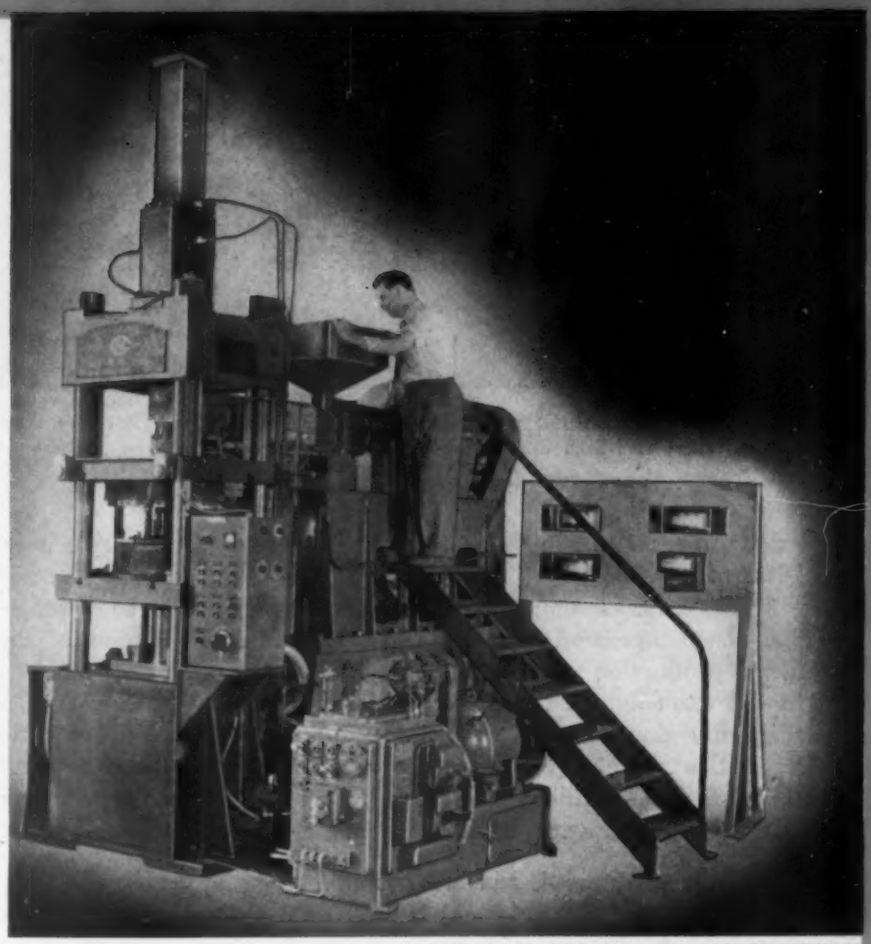
Makers of Plastic Molds · Die Cast Molds · Engraved Dies · Steel Stamps · Hobbings · Pantagraph Engraving

D&E



Three-quarter end view of the new 48-oz. injection molding machine. Shown in the lower foreground is the hydraulic pumping unit which actuates the injection and clamping cylinders. At right center is the temperature control panel. Operator is peering into the material hopper

ALL PHOTOS AND DRAWING COURTESY JACKSON & CHURCH MACHINE CO.

Injecting Extrusion-Heated Thermoplastics

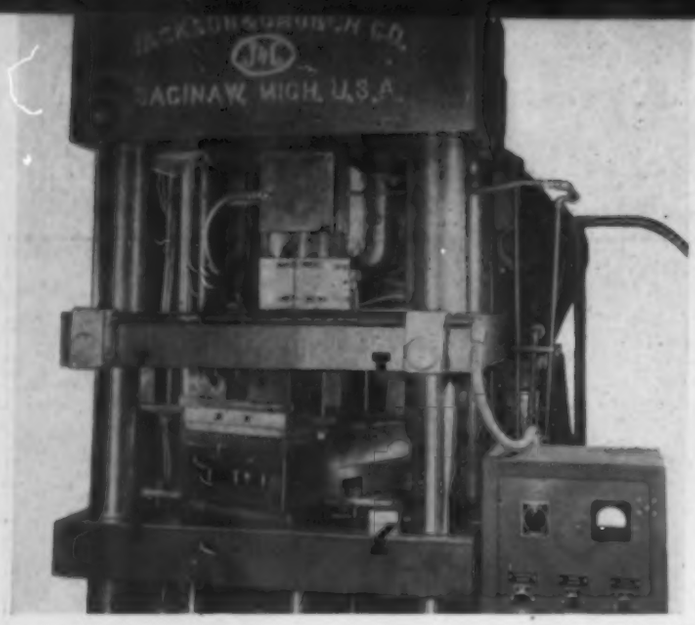
A novel concept in injection molding promises to open new fields for much larger thermoplastic pieces

IMPORTANT to the future economic picture of producing much larger pieces molded of thermoplastics is a recently announced machine which is essentially a combination of an extruder pump and a press. The unit is novel, in that its principle of operation is different, yet it is practical because of its simplicity. Simply stated, the machine makes use of an extruder pump for heating the molding material and forcing it into an injection chamber, as well as a vertical two-ram, tranfer type hydraulic press for clamping the mold and injecting the already thoroughly plasticized material through a sprue and runners into the mold cavities.

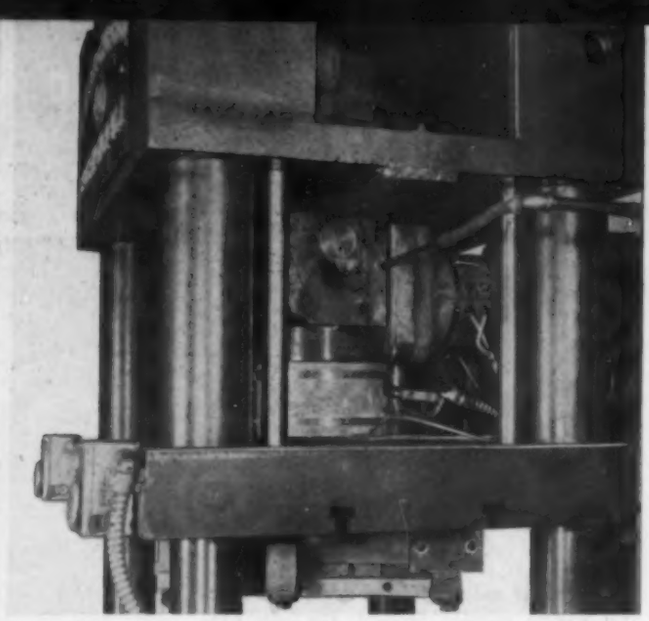
This latest development in the field of injection molding is the brain-child of James Hendry, who became associated with the manufacturer, Jackson & Church Machine Co., Saginaw, Mich., over a year ago for the express purpose of engineering and building this new molding machine.[1] Although this company had never previously produced equipment for molding plastics, its background of experience in the field of specialized machinery production

*Reg. U. S. Patent Office.

[1]Patents applied for.



Front view of machine showing injection cylinder directly under the head of the press. Closed mold can be seen below the center plate



Side view showing injection cylinder and front end of extruder unit. Heater band is wrapped around lower portion of cylinder

enabled its officials to see the potentialities of the basic design.

The first press was completed some months ago, and has been operated on numerous test and continuous production runs in the company laboratory in order to solve all the small problems which appear in any new venture. With a rated capacity of 48 oz., this machine has been run with many molds which varied widely both as to "total shot weight" and clamping area requirements.

Many materials run in tests

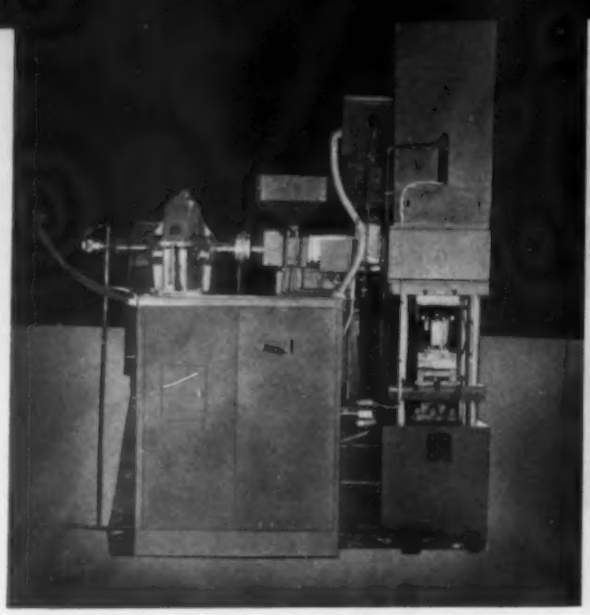
Molds needing as little as 18 oz. as well as molds requiring the top capacity of the machine have been satisfactorily operated. A two-cavity automobile steering wheel mold, so large that its chases extended beyond the platens of the press, was perfectly clamped with a surprisingly low hydraulic pressure on the clamping ram. Several formulations of vinyl, most of the cellulosics, as well as polystyrene and acrylic have been successfully run in these test molds.

This particular 48-oz. machine, which requires only 81 sq. ft. of floor space, is equipped with a 3¼-in. extruder pump of special design. Powered with a 30-hp. motor, the extruder worm can be brought up to speed in less than 1 second. This acceleration is possible because the motor runs continuously and is engaged and disengaged by a patented clutch. The extruder pump is mounted on the side of the vertical press in such a manner that the thermoplastic material is fed from the extruder through its die directly into a special type vertical injection chamber. This injection chamber is mounted on a fixed bolster plate which is located somewhat below the head of the transfer-type press. An auxiliary downward acting hydraulic cylinder is mounted on the head of the press. This assembly is very similar to the auxiliary ram of a transfer press. The ram of this overhead cylinder, however, is so arranged that it will travel nearly to the bottom of the injection chamber, but when it is raised or retracted it will not be completely withdrawn. An opening, or port, machined in the side of the injection cylinder, accommodates the die of the extruder. Thus, with the over-head ram in its retracted, or raised, position, the port is open, permitting the extruder pump to force plasticized material into the chamber.

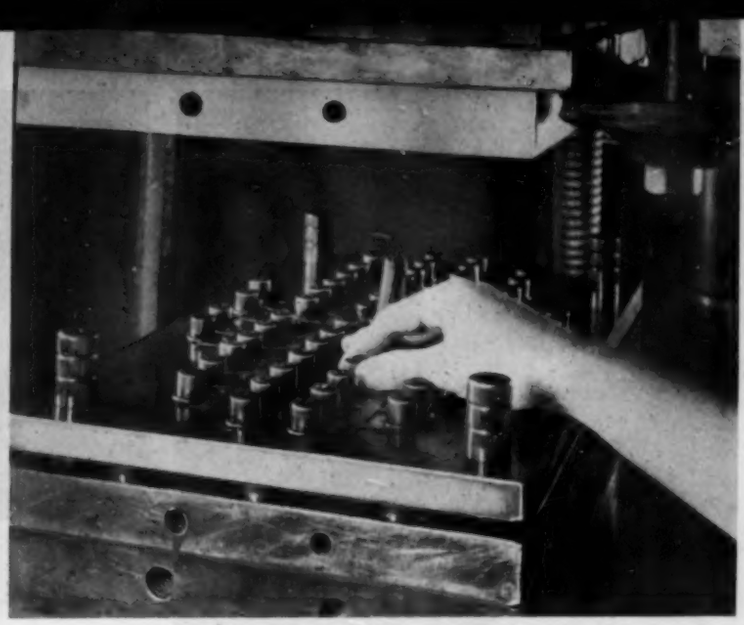
Injection material control

The amount of material thus forced into the injection chamber can be controlled by two methods. By means of a time control on the extruder, it may be operated for a pre-determined number of seconds; by means of a torque control on the extruder worm, the extruder will be automatically stopped when the back pressure of the material creates a predetermined torque. The worm control mechanism, consisting of the timer and clutch, is reported to operate so uniformly from cycle to cycle that the amount of material delivered to the injection chamber does not vary more than ½ of 1 percent. The adjustable torque control operates Micro-switches which disengage the clutch to the driving motor. A similar set of controls serves to start the extruder after the chamber has been emptied and the overhead ram piston raised, opening the port into the chamber.

The extruder pump is designed with three heat zones, each separately controlled by Wheelco indicating pyrometer units. Since the material capacity of the third, or high heat zone, of the extruder is equal to the top capacity of the injection cylinder, only uniformly and completely plasticized material will be forced into the injection cylinder during



Side view of machine showing relationship between plasticizing pump drive (left), pump, and vertical press (right)



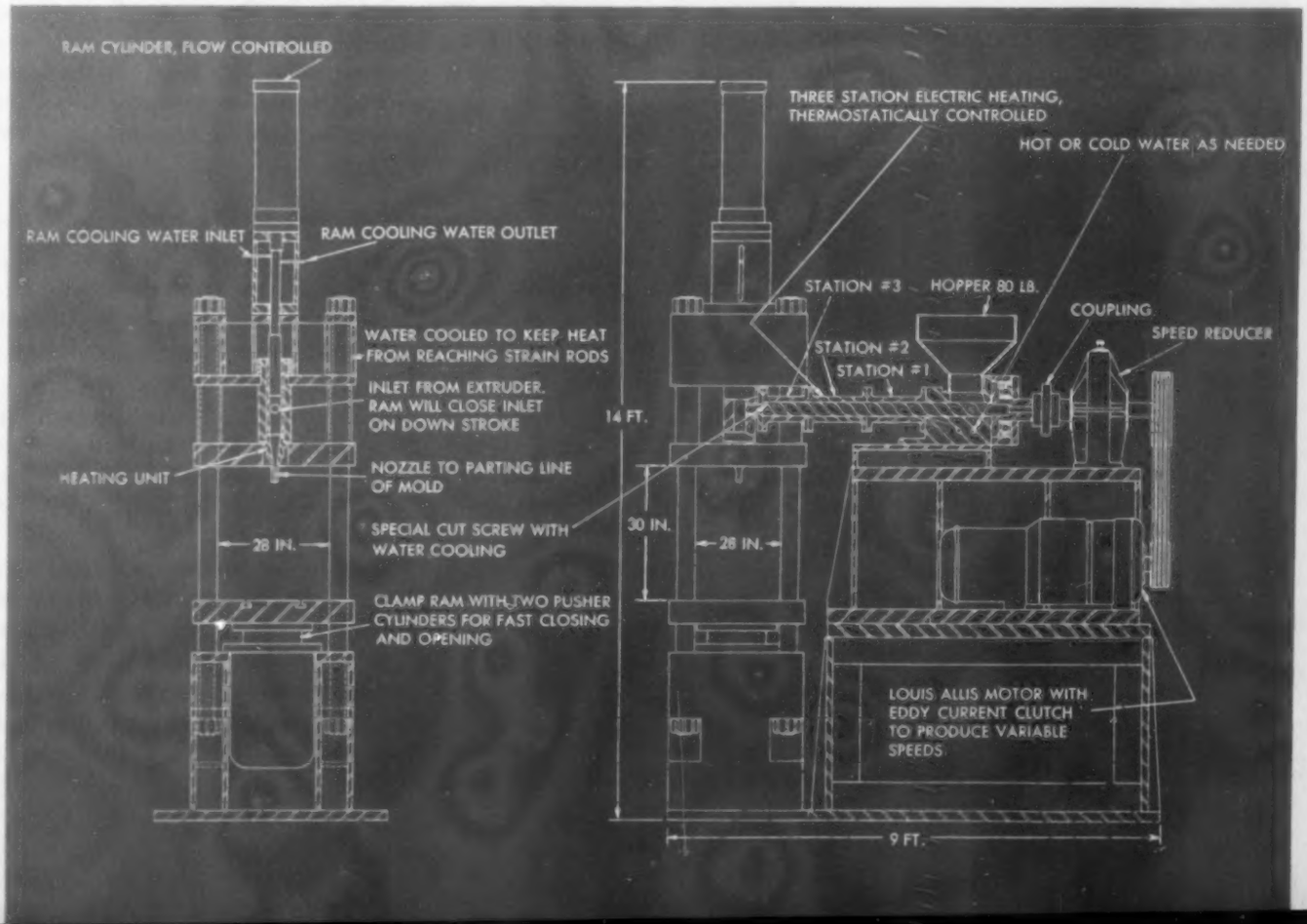
Vinyl protector caps for spark plugs were successfully molded in a 60-cavity injection die in the new machine without any indication of weld lines

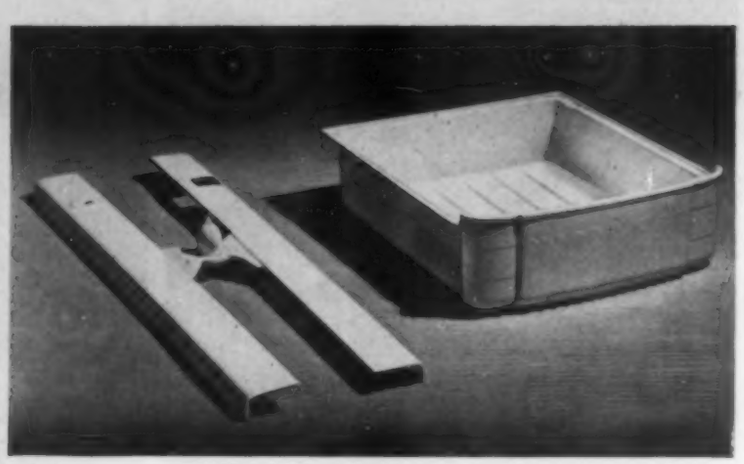
each cycle. Thus the injection piston operates only against completely plasticized material, and the injection pressures required are markedly lower than those normally encountered in standard injection molding.

Another feature of the Jackson & Church machine which makes it unnecessary to use high injection pressures is the complete absence of any spreader, or torpedo, in the injection cylinder. With only relatively low injection pressures, it follows that clamping pressure requirements are comparably low. These low-pressure features make possible the use of relatively light construction for the vertical transfer type press. Furthermore, it is not necessary to use large pumping equipment. It also follows that operating costs are relatively low.

When the two-cavity automobile steering wheel mold was run on this machine, the total cycle for

Schematic lay-out, partially sectioned, to show important functional parts of the machine


RAM CYLINDER, FLOW CONTROLLED
RAM COOLING WATER INLET
RAM COOLING WATER OUTLET
WATER COOLED TO KEEP HEAT FROM REACHING STRAIN RODS
INLET FROM EXTRUDER. RAM WILL CLOSE INLET ON DOWN STROKE
HEATING UNIT
NOZZLE TO PARTING LINE OF MOLD
SPECIAL CUT SCREW WITH WATER COOLING
28 IN.
CLAMP RAM WITH TWO PUSHER CYLINDERS FOR FAST CLOSING AND OPENING
THREE STATION ELECTRIC HEATING, THERMOSTATICALLY CONTROLLED
HOT OR COLD WATER AS NEEDED
STATION #3
HOPPER 80 LB.
COUPLING
SPEED REDUCER
STATION #2
STATION #1
14 FT.
30 IN.
28 IN.
LOUIS ALLIS MOTOR WITH EDDY CURRENT CLUTCH TO PRODUCE VARIABLE SPEEDS
9 FT.



The two polystyrene tray runners on left were molded on a 23-sec. cycle with only 120 tons clamping pressure

Left: Polystyrene tray for use in refrigerators weighs 23 oz., has 150 sq. in. of projected molding area. Clamping pressure was only 180 tons; injection pressure was 3100 p.s.i.

48-OZ. MACHINE SPECIFICATIONS

Ounces per shot	48 oz. (acetate)
Total poundage per hr.	360 lb. (acetate)
Pressure per sq in. on material in injection chamber	10,000 p.s.i. max.
Diameter of plunger	3-in. diameter
Diameter of screw	3¼-in. diameter
Speed of screw	25 to 200 r.p.m.
Projected area	150 to 700 sq. in.
Locking pressure	250, 500, or 1134 tons
Stroke of clamp cylinder	18 to 36 in.
Speed of closing	350 in. per min. slowed down to 60 in. per min. for clamping
Speed of opening	425 in. per min.
*Max. over-all height	14 to 18 in.
Max. daylight opening	30 to 56 in.
*Distance between tie rods	Left to right 28 to 36 in. Front to back 28 to 36 in.
*Floor space required	81 sq. ft.
*Approximate weight	25,000 lb.
Total pressure	35 ton max.
Speed of injection	194 in. per min. max. 20 in. per min. min.
Stroke of injection cylinder	25 in.—To allow for use of top ram for transfer molding of thermosets
Total heater wattage	21,500 watts
Extruder motor	30 hp.
Hydraulic pump motor	20 hp.
Approx. machine operating cost (Based on $0.03 per KWH)	$1.30 per hr.

*Depending on desired locking pressure.

44 oz. of cellulose acetate butyrate was 75 sec., using an injection pressure of 2800 p.s.i. and requiring a clamping pressure of only 150 tons. A four-cavity automotive hood ornament mold was run in acrylic. Total weight of this shot was 36 oz. and the over-all cycle was 3 minutes. Over 2 min. of this 3-min. cycle was required for cooling the very heavy section of the part. When the same mold was run in polystyrene, the total cycle for the 31-oz. shot was only 2 minutes. A large single cavity tray mold for a piece weighing 23 oz. was run on a 30-sec. cycle. In the case of the hood ornament, the injection pressure was 4400 p.s.i. and the clamping pressure was 150 tons. In the case of the large area tray, injection pressure was 3100 p.s.i. and the pressure required for clamping was 180 tons.

Larger models on the way

Such examples of production molding show that this new machine is truly a production job and not simply a laboratory model. Jackson & Church has already engineered two larger models; one having a rated capacity of 60 oz. and the second being designed for 80 ounces. Firm engineers are now at work designing a unit which will have a top rated capacity of 160 ounces. All of the advantages found in the 48-oz. model will be carried over into the three larger sizes.

Thermoplastic molding equipment such as this new machine can benefit the plastics industry in many ways. It will aid in opening up new markets not only by virtue of the larger size parts which it will produce, but also because a reasonable capital out-lay is coupled with economical operating and maintenance costs.

Molding Acrylic Lenses

Even with molds ground to a high degree of accuracy by optical methods, molding techniques and prevention of contamination present serious problems

DURING World War II, many injection molders found to their sorrow that the manufacture of molded lenses demanded a degree of molding skill and mold-making art far different from that required by more conventional injection molded items. Many of the problems peculiar to lens making came to light in the production of molded lenses for the civilian gas mask purchased by the Chemical Warfare Service during the war. In the final analysis, satisfactory lenses could be produced only from molds which were ground by optical methods and with the standard of accuracy used in grinding fine lenses. Even after satisfactory molds were produced, the problems of molding technique and of preventing contamination in the finished product caused some molders to give up the job.

In 1943, Arnold Brilhart, Ltd., Mineola, N. Y., collaborated with engineers of Ansco, Binghamton, N. Y., in a research program aimed at the production of molded acrylic lenses which would perform satisfactorily in the finder system of reflex cameras. Plastic lenses in cameras offer the possibility of price reduction. Plastic lenses are lighter than glass units of the same size and type, thereby making it possible to produce lighter cameras. Light transmission of an acrylic lens is said to be better than that of a similar lens mass produced in glass.

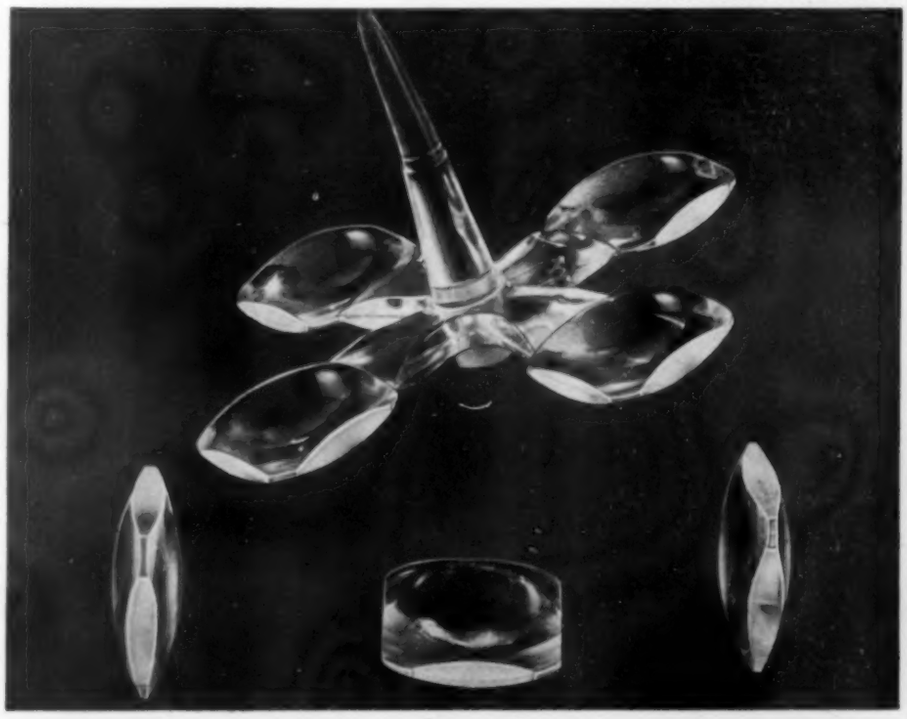
Special acrylic formulation

Many thousands of dollars were successfully invested in this research work at the Brilhart plant; today this company is producing many different sizes and types of satisfactory acrylic lenses. All of these lenses are molded of a Plexiglas formulation specially compounded for this type of product.

First production efforts were directed at small lenses. However, when Ansco designed its new Rediflex camera, it called for a lens in the finder system which measured approximately 2¼ in. square and was over ¾ in. thick through the center (Fig. 1). Although the know-how acquired in producing the small lenses was of value in preparing to mold this new job, it became apparent as soon as the molds were put in production that a complete readjustment of technique was necessary before satisfactory parts could be made on a production basis. A four-cavity mold (Fig. 2) had been

(*Please turn to page* 88)

ALL PHOTOS COURTESY ROHM & HAAS CO.



1 — Measuring 2¼ in. square and over ¾ in. thick through the center, these acrylic lenses are lighter than glass lenses of the same size and type. They are being used in finder systems of reflex cameras

Compelling

compelling more attention...

HOLLACE SHAW, lovely concert star, heard regularly over C.B.S.

. . compelling more sales with PLASKON MOLDED COLOR

APPEALING COLOR

Thermosetting Plaskon Molded Color tones lend rich sales appeal that results in buyer preference. This lustrous color is permanent, non-fading . . . *solid color* through and through.

ATTRACTIVE DESIGN

Thermosetting Plaskon Molding Compounds can be molded into any practical shape and design, to achieve unusual and distinctive product identity. Molded Plaskon retains its shape permanently—will not sag or warp under influence of heat.

ECONOMY

Once the original mold is established, thermosetting Plaskon compounds can be molded in large quantities at low cost, each finished article true and exact to specification. No polishing is required . . . no costly finishing operations.

Write for free illustrated Plaskon Molded Color book. Services of our expert technical men are available to you.*

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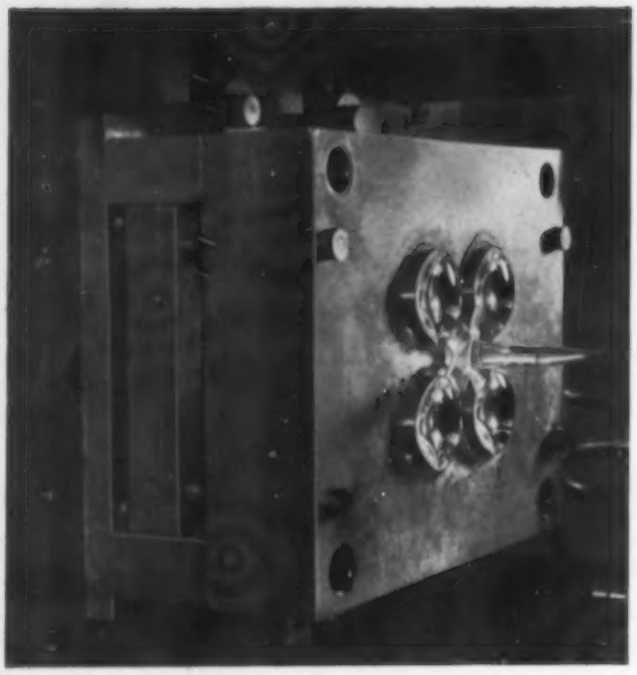
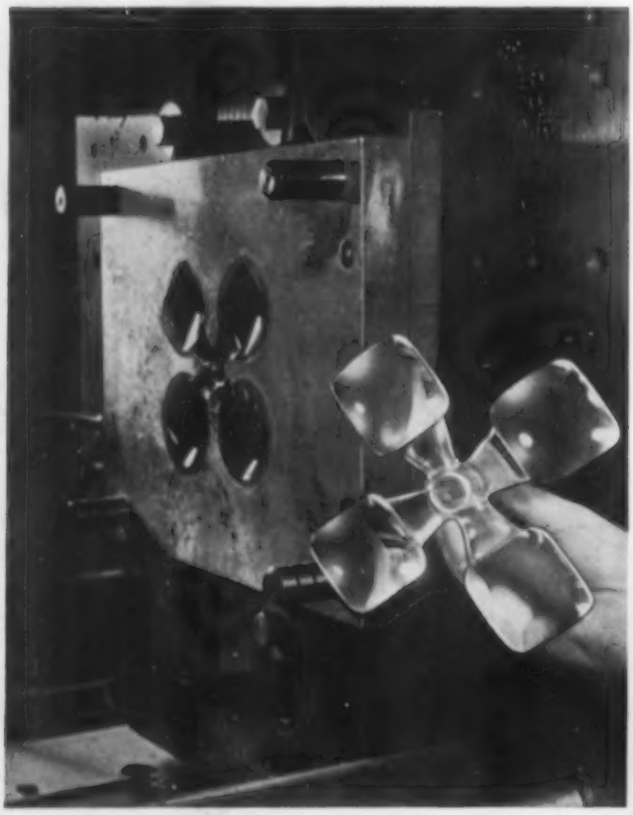
Boston, Chicago, Los Angeles, New York, Rochester, San Francisco
Manufacturers of Molding Compounds, Resin Glues, Coating Resins

PLASKON
TRADE MARK REGISTERED
MOLDED COLOR



2 — Four-cavity mold before removal of shot. Cavities of die are so highly polished, chrome plating is not needed



3 — To insure even flow of material, gates were made 1⅜ in. wide and ½ in. thick with runners fanning to same width

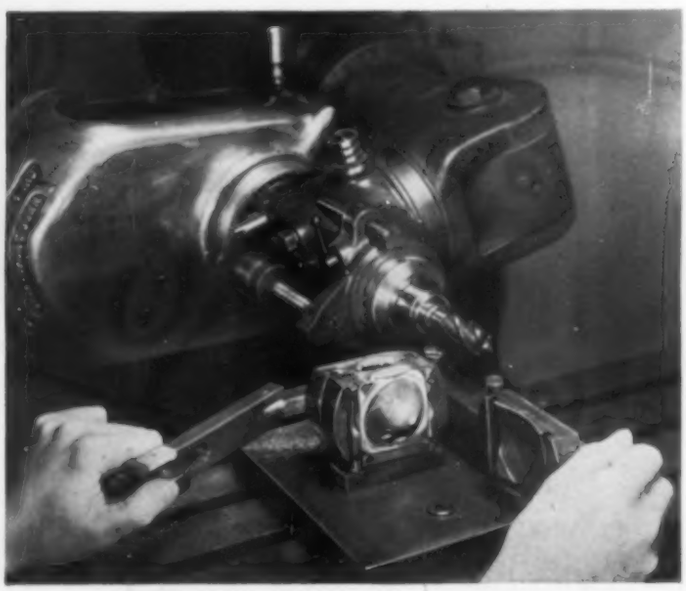
produced with cavity sections so highly polished that it was not necessary to chrome plate them.

As is general practice in injection mold design, the gates were originally rather small. However, it was found desirable to increase their size to 1⅜ in. wide and ½ in. thick, with the runners fanned out from a width of ⅝ in. at the sprue to 1⅜ in. at the gate (Fig. 3). The actual connection of the gate to the molded lens was ground to blend with the contour of the two surfaces of the lens and to have the same thickness as the side of the lens.

Injection cylinder overcomes problems

Initial production on this large lens was very poor for many months. Rejections ran as high as 80% for a time, but today the parts which do not meet Ansco's rigid specifications are held to a satisfactory minimum. Even those lenses which are discarded look satisfactory to the average laymen. They could still be used as small magnifying glasses although they do not meet camera finder lens requirements. The molder states that much of the credit for overcoming many of the molding problems for lenses must be given to the latest design Watson-Stillman injection cylinder. These cylinders are installed on all machines at the Brilhart plant doing this type of work.

After the molder overcame the technical molding aspects necessary to produce perfect clarity and optical accuracy in the lenses, the problem of molding them without dirt specks caused many headaches. Overcoming such contamination involved two major engineering changes. First, each machine was enclosed in a room of its own and ventilation for each room was provided by filtered air. All non-operating portions of the machines are painted white to promote good shop housekeeping. The second change involved removal of the material hopper from the machines, which are now hand fed



4—After lenses are annealed in warm water and sawn from runners, gates are milled to dimensions in special jig

with a measured quantity of pre-heated material for each shot.

Scrap from the runners and sprue, which is about 30% of the total weight of the shot, cannot be used for molding first quality lenses. Only virgin material will give the desired results. Hence cost of the finished lenses is higher than the unit cost would be on a job where scrap can be reclaimed.

The chase, or mold nest, for this lens, as well as for lenses of other sizes, is cored with many channels so that a thermostatically controlled circulating liquid can hold all sections of the mold accurately to a predetermined temperature.

All functions in the molding operation are automatically timed after the cycle is started by the operator. A very slow injection speed is used and the dwell of the injection pressure is held for 5 minutes. After the pressure has been automatically released, the lenses are permitted to chill in the mold for an additional minute and a half. At the end of this time the mold automatically opens and remains open until the operator removes the shot and closes the safety gates. The over-all cycle for this particular big lens is approximately 7 minutes. The molded parts are annealed in a warm water bath before they are sawn from the runners, after which they are placed on a special jig (Fig. 4) which holds them rigidly during a milling operation that finishes them to accurate dimensions.

One other type of camera finder lens being molded of acrylic in a 10-cavity mold at the Brilhart plant is shown just after the mold opened, in Fig. 6.

Inspected for contamination

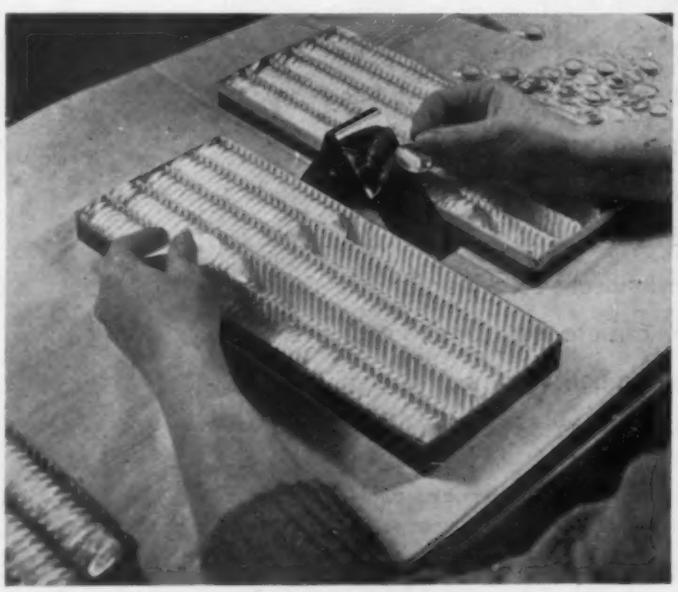
Rigid inspection is applied to the entire line of lenses molded by this company. The lenses are illuminated by an intense light (Fig. 5) and the inspector looks through each lens at a highly polished piece of metal. This system insures that only lenses which are completely free from dirt specks will be passed as satisfactory.

The company was recently licensed under the

(*Please turn to page* 93)

7—Special injection machine for producing watch crystals uses air cylinders for injection pressure and mold clamp

6—A smaller type finder lens is produced in 10-cavity mold. Its gates and runners have also been made large



5—By using bright light and polished metal background, dirt specks on all size lenses can be spotted by inspector

The prospects are good...and plentiful for users of this campaign!

The advertisement on the opposite page—another of a series in a current Cyanamid Plastic campaign—is getting the attention of more than *400,000** hand-picked manufacturing executives, designers and material buyers—many of whom, *live prospects* for thermoset-molded products, are located right *in your own backyard.*

As you can see, we're working hard to pre-sell markets for you, and you can do a lot for yourself by taking advantage of our efforts. You and your salesmen can make good use of free reprints of these *selling* advertisements. So, ask us for some. You can mail them out to prospects, and your salesmen can use them for *direct* sales-making.

Call on us at any time—for any help that you believe we can give you on sales, merchandising, or technical procedure. We are *always* ready to help.

* This advertisement—and this entire campaign—is appearing regularly in such publications as FORTUNE, MODERN INDUSTRY, DESIGN NEWS, PLASTICS WORLD, PACIFIC PLASTICS, CANADIAN PLASTICS.

Hand vacuum cleaner, product of Singer Sewing Machine Co.; handle molded by Diehl Mfg. Co.

Speed-Grip Sander made by Behr-Manning Corp.; handle molded by Waterbury Co., Inc.

Beetle* plastic makes beautiful handles

...And Handles Beautifully

With a BEETLE plastic handle you lift a product to higher sales and better performance. And here's *why*... Its color goes all the way through and can't wear off through sweaty handling... Oil or grease wipes readily off BEETLE handles and they won't tarnish or rust... BEETLE Plastic is warm, smooth and pleasant to touch... It is an excellent electrical insulator and won't build up static charges (door-knob makers please note).

Maybe we can help increase the sales and reduce the costs of *your* product. Let us send you complete information about fast-cure BEETLE Plastic (design, production, technical and sales data), or consult a reliable molder in your vicinity. Write to Plastics Department, American Cyanamid Company, 32 Rockefeller Plaza, New York 20, N. Y.

AMERICAN Cyanamid COMPANY

PLASTICS DEPARTMENT

32 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

*Reg. U. S. Pat. Off.

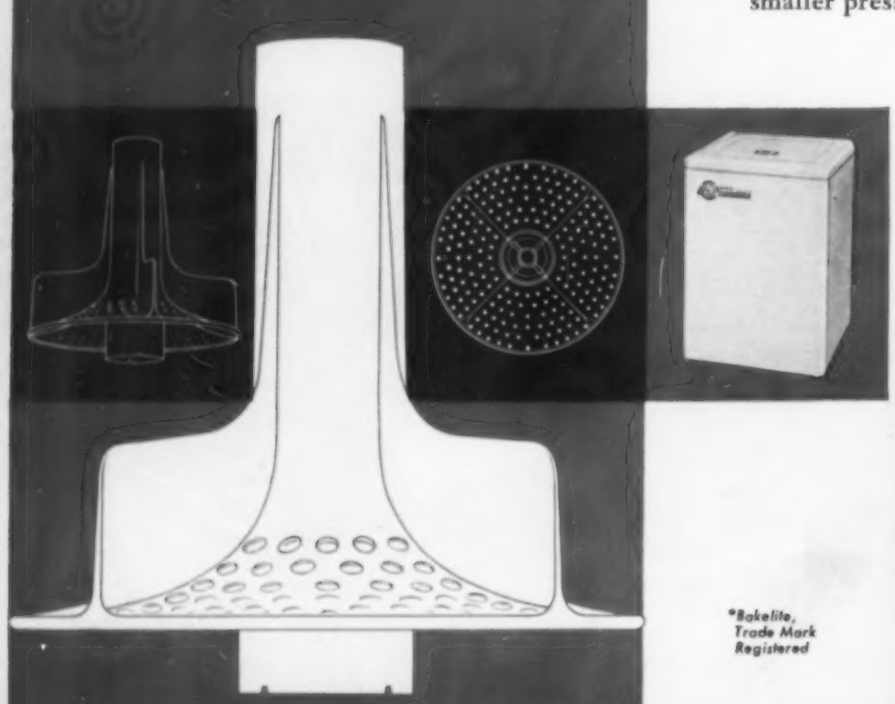
BEETLE* plastics—urea-formaldehyde thermosetting molding compounds. MELMAC* plastics—melamine-formaldehyde thermosetting molding compounds, industrial and laminating resins. URAC* resins—urea-formaldehyde thermosetting industrial resins and adhesives. MELURAC* resins—melamine-urea-formaldehyde thermosetting resin adhesives and laminating resins. LAMINAC* resins—thermosetting polyester resins.

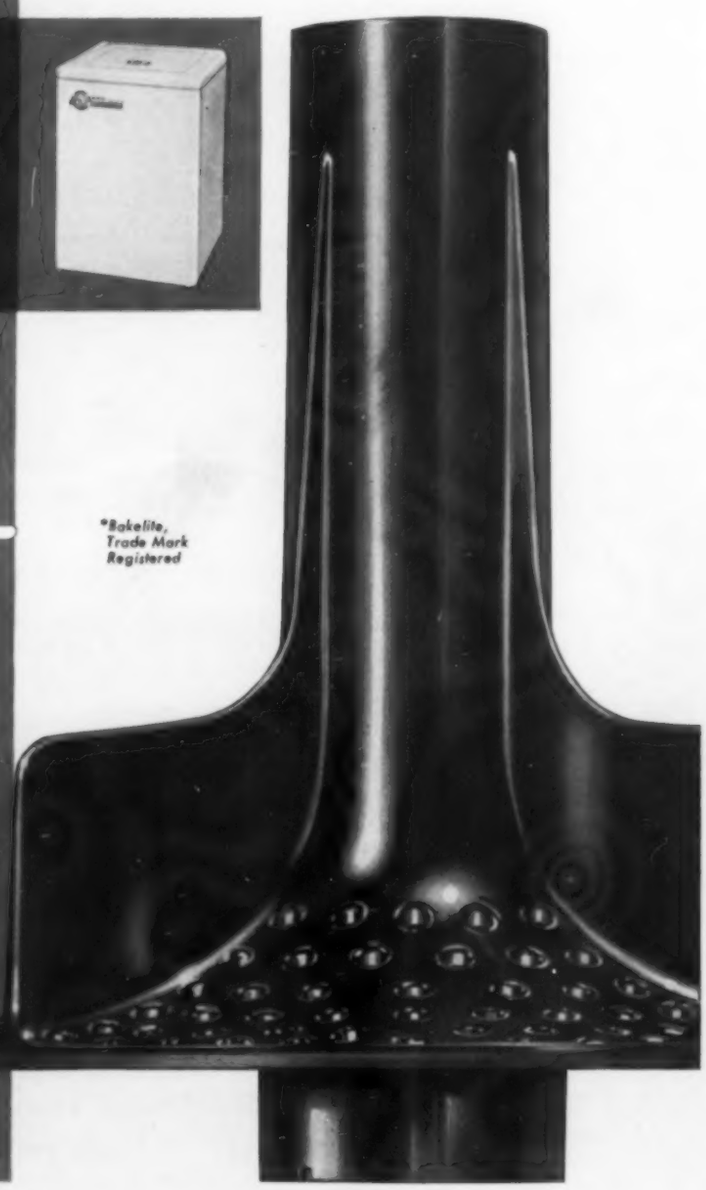
GENERAL AMERICAN is molding one of the most unusual plastic pieces ever made!...

The BENDIX *Economat* AUTOMATIC WASHER AGITATOR

The design called for an agitator with essentially two shafts—one carrying vanes, the other extending below the bottom of the bell. The bell itself required 192 drain holes. The entire agitator was to be driven by a spline shaft requiring a molded tolerance of .0025″ plus or minus. And all this had to be done on a piece with a 14″ depth of draw!

General American built a mold with a solid steel cavity. Using careful mold design and unique methods of venting, General American solved the difficult flow problems. Now the Bendix Economat Bakelite* Agitator is being made in a 4-cavity mold on a 2000-ton compression press and in a single cavity mold on a smaller press.





*Bakelite, Trade Mark Registered

Like leading manufacturers in other industries, Bendix relies on General American's 50 years' of precision production experience and on General American's equipment which includes 2 oz. to 48 oz. injection presses and compression presses up to 2000 tons (71″ x 74″ platen areas).

General American Plastics can serve you, too — efficiently and economically. Write to General American for information.

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135 South LaSalle Street · Chicago 90, Illinois
New York, 10 E. 49th St. Los Angeles, Richfield Bldg.

Kingston patent (U. S. patent number 2,314,838) for this type of work.

The techniques evolved in the Brilhart plant have also made it possible to produce satisfactory watch crystals with very critical dimensions. To insure satisfactory injection molding of watch crystals, the company engineers devised a special type of injection machine (Fig. 7). Two air cylinders are used for power, one operating the mold clamp and the other operating the injection piston.

Gravity-fed mold for watch crystals

In Fig. 8, the operator is removing two small watch crystals which have been produced in a two-cavity hand type injection mold. This close-up shows the funnel type of material hopper which feeds by gravity directly to the small molding chamber. Having removed the two finished lenses from the mold, the operator places the two halves of the mold together, inserts the mold in place under the injection nozzle, and presses on the lever seen at the upper right. This lever actuates first the mold clamp and then the injection piston. A Wheelco unit controls the temperature of the electrically heated injection cylinder. For this particular mold, a total of 60 sec. is required; the production of the one small machine is approximately 120 lenses per hour. Each shot of lenses is placed in a special tray so that there will be no possibility of their being scratched while being carried to the various finishing and inspection operations.

After molding, the watch crystals are first roughly sawn from the sprue and then finished by wet grinding (Fig. 9), or a milling operation. All watch crystals are given minute scrutiny by final inspectors.

Acrylic prisms

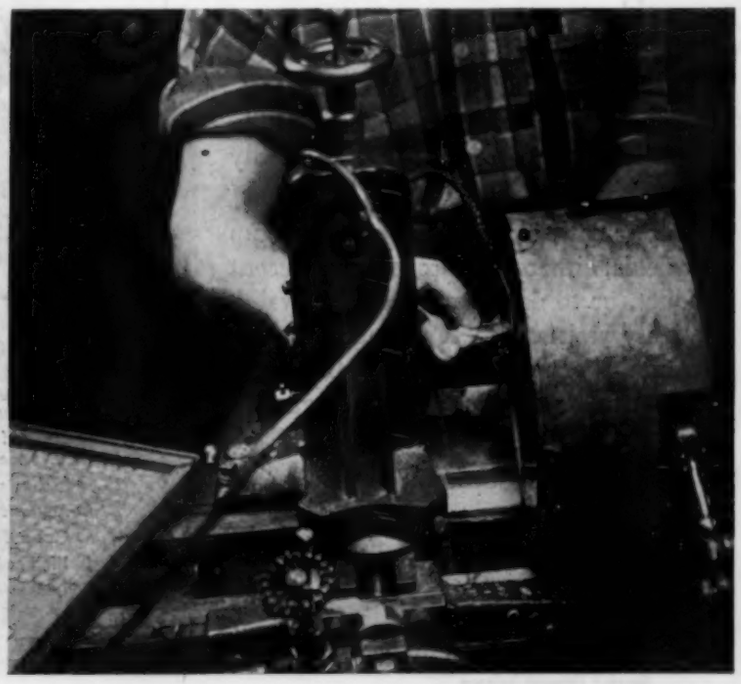
Brilhart has recently completed a test mold for a prism, working in cooperation with Eastman Kodak Co., Rochester, N. Y. A short run with this mold indicates that optically satisfactory prisms will soon be available which will not only compete satisfactorily on a price basis with glass prisms but will also be comparable to glass prisms from a quality standpoint.

The one major shortcoming of acrylic lenses and prisms at present is that their surface hardness is not completely satisfactory. But the problem is not insurmountable. Much research work has been done by several large organizations, directed toward development of a simply applied coating for acrylic which will 1) increase surface hardness, 2) have no effect on optical properties, and 3) be comparatively simple to apply. Although at present such coatings can be applied to sheet stock, the cost is high and the methods of application are difficult to control. It is possible, however, that the time is not far distant when formulations will be developed that can be applied to molded acrylic parts without the necessity for baking temperatures above the safe heat distortion point.

Once the problems of surface hardness is overcome, the possible applications for molded plastic lenses will be limited only by the demand for all lenses.

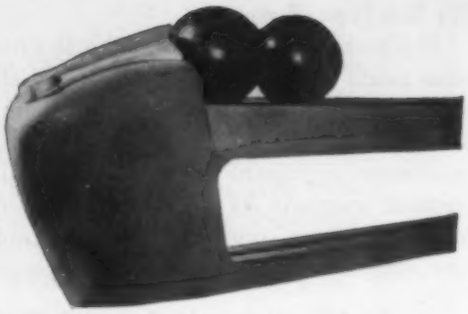
8 — One operator using two-cavity hand type mold with special injection machine produces 120 lenses per hour

9 — Perfect finish of gate is achieved by wet grinding. A swivel type jig is employed to locate the lens accurately during this operation



Bowling Scorer's Table

Miscellaneous Parts

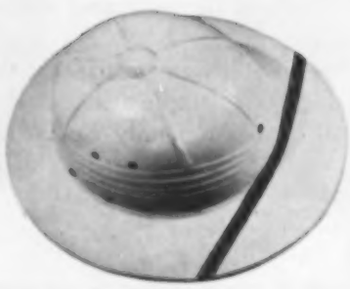


Bowling Alley Parts

Tote Boxes

Fender Guards

Mixing Bowls



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Royalite is ideal for fabricators of thermo-plastics. It can be formed, sawed, sheared, punched, drilled, sanded, cemented, polished, all on low cost equipment. Its variety of uses is practically infinite.

This remarkable composition opens up new fields, either to improve your present product, or to design new ones. Royalite is highly resistant to severe impacts and abrasion. It can be produced in almost any color—can be finished smooth, grained, or patterned.

Technicians of United States Rubber Company will help you select the type of Royalite best suited to your purpose. Write us.

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- Easily formed into compound or irregular shapes with inexpensive tools.
- In sheets any thickness from .0312 to .500 inches.
- Any color available, solid throughout its entire thickness.
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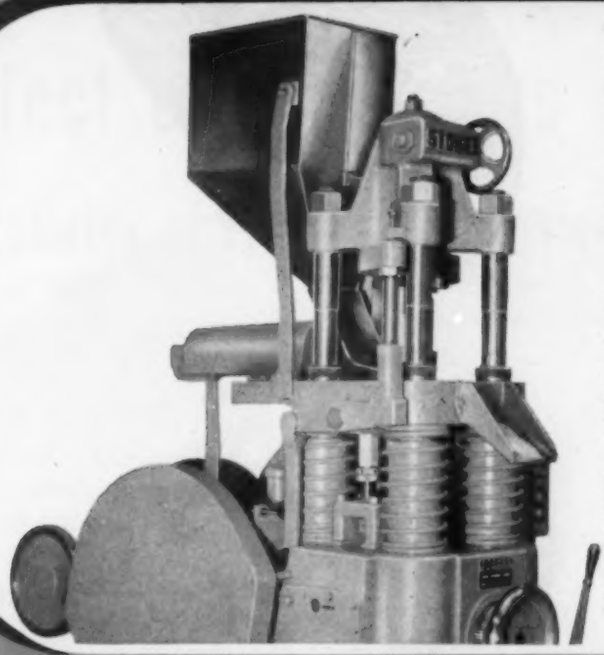
ASK STOKES

Figuring on BIG Plastic Parts?



BIG preforms are exactly what you need for economical production of television and radio cabinets, or any other large pieces.

The Stokes 294 makes preforms up to 4" by 6" of any shape, with 2⅜" depth of fill . . . weights to 300 grams (two-thirds of a pound). Preforms are of uniform density throughout, owing to simultaneous application of pressure from top to bottom. There are no soft spots . . . no under-fills . . . no waste materials . . . fewer rejects. Production up to 60 preforms per minute.

And when you buy a Stokes preformer, you are buying sound design, with reliable performance assured for the life of the machine.

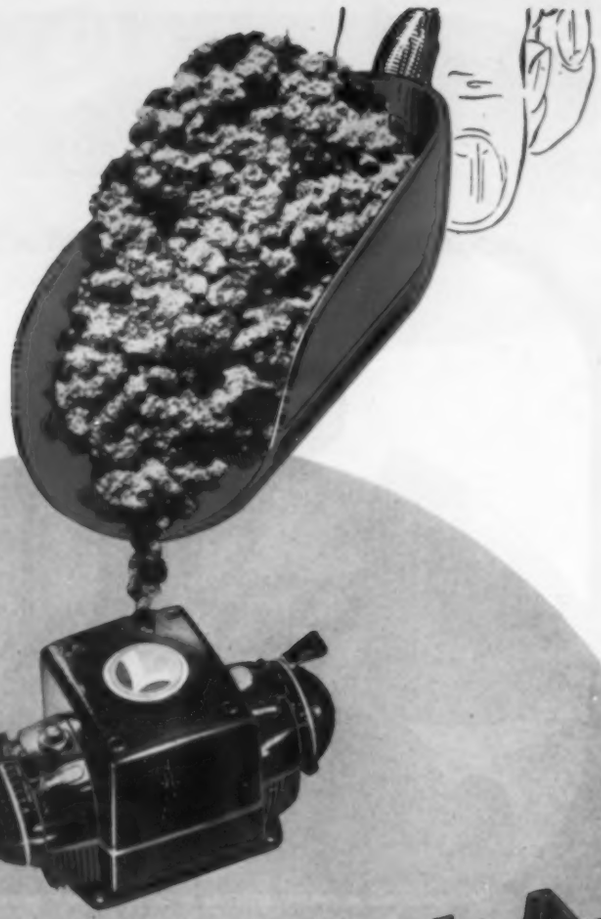
Write for complete description of this modern preform press.

PREFORMS UP TO 4" DIAMETER
SPECIAL SHAPES TO 4" x 6"
DIE FILL 2⅜"
PRODUCTION UP TO 60 PREFORMS PER MINUTE

F. J. Stokes Machine Company,
5934 Tabor Road,
Philadelphia 20, Pa.

FJS

STOKES KNOWS HOW



Both Manufacturer and Purchaser Profit

The two-piece housing for this popular piece of model railroad equipment is molded exclusively of Durez 13124 by Jersey Plastics and Diecasting Company for The Lionel Corporation. Durez 13124 is an impact material **(a flock filler is used to give high impact strength)** having unusually good finish and excellent molding characteristics.

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• *Excerpt from a feature article appearing in the March 1949 issue of Durez Plastics News, published by Durez Plastics & Chemicals, Inc.*

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Effect of Stabilizers and Lubricants

on the Coloring of Plasticized Polyvinyl Chloride-Type Compounds

by WALTER K. CLARK*

Many compounders of plasticized polyvinyl chloride-type products use a basic colorless formulation to which they add various colorants depending upon the specific color requirements of the end product. Such colorless vinyl compounds contain stabilizers and lubricants which have been chosen without regard to their effect on particular colorants. In the present work, it is shown that every colorant studied was extremely sensitive to particular combinations of heat and light stabilizers and lubricants. The incorporation of a colorant without regard to stabilizers and lubricants resulted in breakdown of color, in migration, and in other changes commonly associated with deterioration of a vinyl product. It is concluded that colorants should be selected with regard to their interaction with the stabilizers and lubricants of the compound. Since it has now been shown that each of the several essential components of plasticized polyvinyl chloride-type compounds affects the heat and light stability of the colorant, it is further concluded that statements as to the performance of a particular colorant can only be made for tested formulations.

THE present-day uses of plasticized polyvinyl chloride-type resins are highly diversified. These thermoplastics are being employed in the production of many flexible materials, for example, shower curtains, upholstery, floor and wall covering, belting, and luggage in a variety of finishes and colors. In these finished products, color is one of the most important properties because any one of thousands of possible shades may be required and because any instability of the original color is apparent before any changes in other properties can be measured.

The selection of suitable colorants for these materials has been recognized as a problem for several years. Proper selection of colorants has been shown to depend upon certain of the components of the finished plastic. The essential components of the finished uncolored plastic are resin, plasticizer, filler (if the plastic is to be opaque), stabilizer, and lubricant. Of these five components, three have been studied elsewhere in some detail and, therefore, are already known to affect the choice of a colorant.

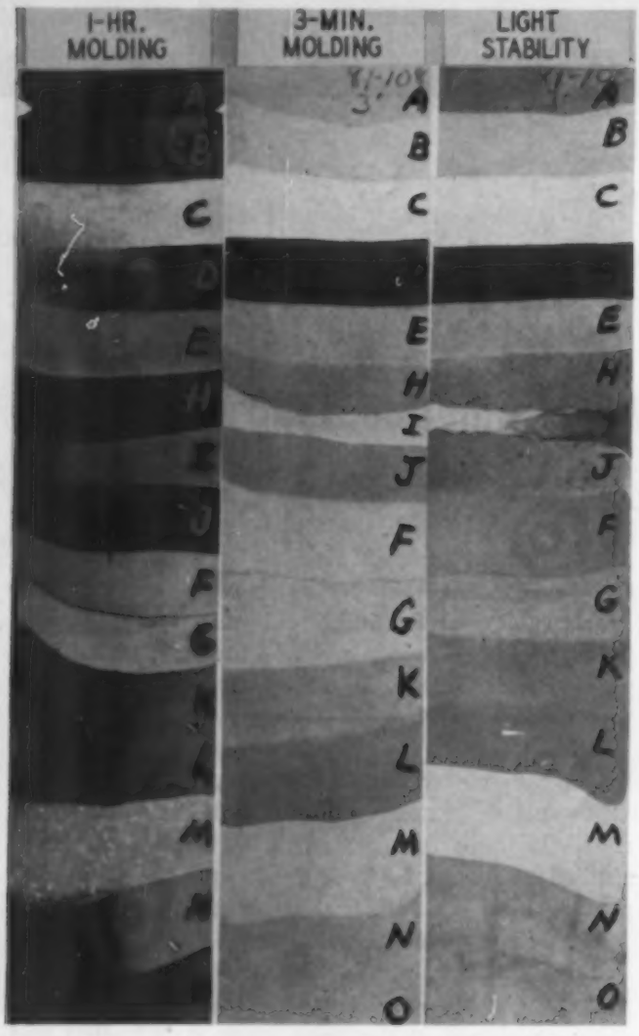
One of the three known factors in the choice of a suitable colorant is the resin itself. The coloring of polyvinyl chloride-type resins is affected by the color developed in the resin when it is heated and molded. From an unstabilized resin there may be released a very small amount of acid which tends to turn the final plastic yellow. Therefore, the resin is stabilized with some chemical which will either neutralize the acid or, more ideally, prevent the decomposition. However, with stabilizers available to date, there is still a tendency toward development of a yellow component and the choice of a colorant for a particular plastic is limited by this effect. Haworth and Leyland[1] noted that the stability of colorants in polyvinyl chloride-type resins also varied from polymer to polymer dependent upon residual amounts of polymerization catalysts.

It is well known also that the choice of a colorant for a particular plastic is limited by the plasticizer employed. If the colorant is soluble in the plasticizer, migration of the plasticizer in the finished film will, of course, carry the color to the surface where it may transfer to other surfaces. Therefore, for plasticized compounds, insoluble pigments and lakes and toners are indicated. However, if the colorant is even slightly soluble in the plasticizer chosen, a change to another plasticizer will tend to affect the coloring of

*Chemicals Div., The Glenn L. Martin Co., Baltimore 2, Md.

[1] J. Haworth and B. N. Leyland, Silk Journal and Rayon World 23, 30-32, 35-52 (1947).

1—Effect of stabilizers and lubricants on the heat and light stability of colorant 1 (green toner)



Key to color changes in Fig. 1, above

Set. Label	1-hr. molding		3-min. molding		Light stability	
	ASTM D 680-45T	Munsell Color No.	ASTM D 680-45T	Munsell Color No.	ASTM D 680-45T	Munsell Color No.
A	Extreme	5.0G2/2	Control	7.5G3/4	Extreme	7.5G2/2
B	Extreme	5.0G2/2	Appreciable	7.5G4/6	Appreciable	7.5G3/4
C	Appreciable	2.5G4/4	Appreciable	5.0G5/6	Appreciable	2.5BG5/6
D	Appreciable	10.0G6/6	Extreme	7.5G4/6	Extreme	2.5BG3/4
E	Slight	7.5G3/6	Slight	7.5G4/6	Slight	7.5G3/6
H	Extreme	2.5G1/2	None	7.5G3/4	Extreme	2.5G3/4
I	Appreciable	10.0G5/6	Appreciable	10.0G5/6	Extreme	2.5Y4/2
J	Extreme	7.5G2/2	Slight	7.5G3/4	Extreme	7.5G2/2
F	Appreciable	2.5G4/6	Slight	5.0G5/8	Extreme	2.5G4/6
G	Slight	7.5G4/6	Slight	7.5G5/6	Appreciable	7.5G3/4
K	Extreme	7.5G3/4	Slight	7.5G4/6	Appreciable	5.0G3/4
L	Extreme	7.5G3/4	Appreciable	7.5G4/6	Appreciable	5.?G3/4
M	Appreciable	10.0G5/6	Appreciable	7.5G5/6	Extreme	10.0G6/6
N	Extreme	7.5G2/2	Slight	7.5G4/6	Appreciable	7.5G3/4
O	Extreme	10.0G2/2	Slight	7.5G4/6	Slight	10.0G3/4

the finished plastic. For example, it was shown by Oehlcke[2] that tricresyl phosphate has a greater tendency to swell certain colorants than has dibutyl phthalate and, therefore, it produced greater bleeding of these colorants. The purity of plasticizers, particularly the sulfuric acid acidity, was noted by Delorme[3] to influence the color of the plastic. In addition, Haworth and Leyland[1] found that the heat and light stability of various colorants varied with the type of plasticizer employed.

The choice of a colorant for a particular plastic is also known to be affected by the filler employed. Gournay[4] showed that amounts of titanium dioxide and antimony trioxide (valentinite) which produced the same opacity did not produce the same heat and light stability with certain colorants.

In this report it will be shown that the failure of many colorants to retain their shade when compounded with a polyvinyl chloride-type resin is due to their tendency to react with the particular stabilizer and/or lubricant which is employed. Clark[5] reported on the coloring of stabilized vinyl chloride-acetate copolymers and rated numerous specific colorants for bleeding and for heat and light stability. However, in this and in other reported work the choice of a colorant was emphasized without detailed reference to the effects of different stabilizers and lubricants. In connection with the work now reported, numerous proprietary pigments, lakes, and toners have been evaluated with various stabilizers and lubricants in order to observe migration and heat and light stability of the colorant. Only a small part of the data is being reported. However, the photographs show conclusively that changes in the stabilizers and lubricants have as pronounced effects on the heat and light stability and migration of the colorant as changes in any other of the components of a plasticized polyvinyl chloride-type compound.

Table I.—Test Formula

Component	Parts by weight	Weight in grams
Step one		
Marvinol VR-10 (polyvinyl chloride-type resin)	100.0	300.0
Di-2-ethylhexyl phthalate	50.0	150.0
Colorant	0.3	0.9
	150.3	450.9
Step two		
Stock from step one	150.3	15.00
Stabilizer or lubricant	1.8	0.18
	152.1	15.18

Test procedure

In order to study the effects of various stabilizers and lubricants on the color of the plasticized films it was necessary to mold the stocks for stabilizer studies without lubricants and the stocks for lubricant studies without stabilizers. In some cases a combination stabilizer-lubricant was employed. Fillers have been omitted from the test formula in order to eliminate the possibility of reaction with and adsorption of the colorants and in order to produce molded pieces which might be viewed by transmitted light. Finally, a single plasticizer has been employed in order to eliminate this factor as a variable in migration and stability effects. The

[2]C. R. M. Oehlcke, J. Soc. Dyers and Colorists *61*, 300-310 (1945).
[3]J. Delorme, Rev. Gen. des Mat. Plastiques *24*, No. 1, 78-82 (1948).
[4]F. Gournay, Rev. Gen. Caout. *23*, No. 1, 12-16 (1946).
[5]F. G. Clark, Ind. Eng. Chem. *35*, 368-374 (1943).

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particular plasticizer chosen (di-2-ethylhexyl phthalate) was used as a comparative standard because it is accepted throughout the industry as a satisfactory general-purpose plasticizer.

The test formula employed in this work appears in Table I and the various components are listed in Table II. A high molecular weight polyvinyl chloride-type resin identified as Marvinol VR-10 has been used throughout this work. However, experience has shown that the effects of stabilizers and lubricants on the coloring of compounds based on Marvinol VR-10 were, in general, comparable with effects on the coloring of compounds based on other similar polyvinyl chloride-type resins.

It may seem that the colorant loading in this formulation is quite low. However, a low concentration permits the observation of small color changes with any of the many stabilizers or lubricants which were being studied. Therefore, it emphasizes the colorant-stabilizer-lubricant combination most likely to produce the maximum heat and light stability of which a particular colorant is capable.

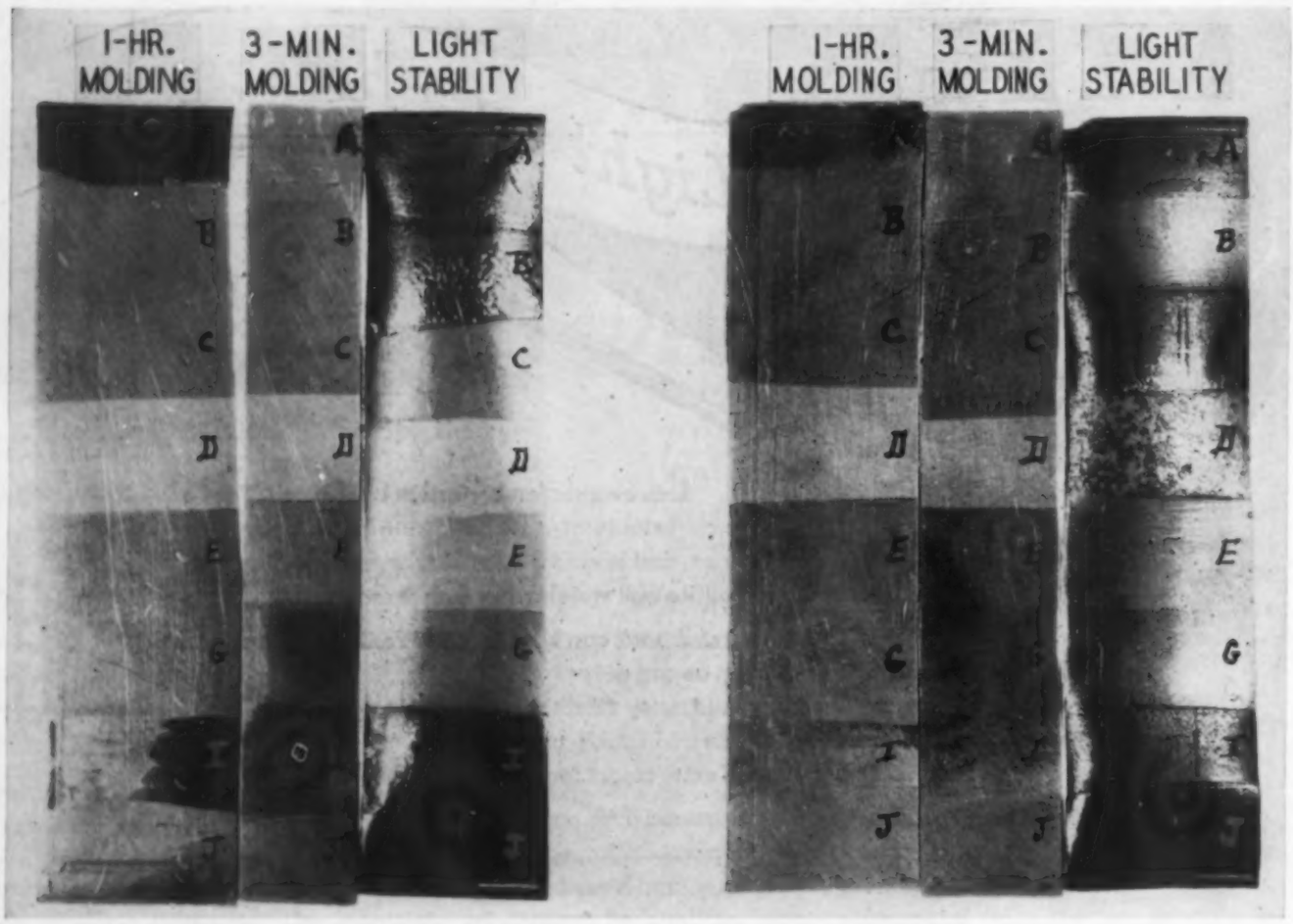
The general procedure employed in this work was:

Step One. Marvinol VR-10 (polyvinyl chloride-type resin), plasticizer, and colorant were weighed into one beaker, thoroughly mixed, and placed on a 6 by 12-in. mill tightened to yield a band thickness of about 10 mils. Stock was allowed to band on the front roll, then cut and rolled as soon as a continuous sheet was formed. It was passed endwise 10 times and sheeted off at 0.100-in. thickness.

Temperature of front roll, °F.	285
Temperature of back roll, °F.	240
Speed of front roll, r.p.m.	18
Speed of back roll, r.p.m.	25
Total milling time, min.	7

Step Two. Fifteen-gram portions of stock from Step

2—Effect of stabilizers and lubricants on the heat and light stability of colorants 2 and 3 (Indian reds)



Key to color changes in Fig. 2, above

Section Label	1-hr. molding		3-min. molding		Light stability		1-hr. molding		3-min. molding		Light stability	
	ASTM D 620-46T	Munsell Color No.	ASTM D 620-46T	Munsell Color No.	ASTM D 620-46T	Munsell Color No.	ASTM D 620-46T	Munsell Color No.	ASTM D 620-46T	Munsell Color No.	ASTM D 620-46T	Munsell Color No.
A	Extreme	5.0R1/1	Control	5.0R3/4	Extreme	5.0R1/1	Extreme	2.5R3/3	Control	2.5R3/4	Extreme	2.5R1/1
B	Slight	5.0R3/4	Slight	5.0R3/4	Extreme	5.0R1/1	Slight	2.5R3/4	Slight	2.5R3/4	Slight	2.5R3/4
C	Slight	5.0R3/4	Slight	5.0R3/4	Slight	5.0R3/3	Slight	2.5R3/4	Slight	2.5R3/4	Extreme	2.5R1/1
D	Extreme	2.5R4/4	Extreme	2.5R4/4	Appreciable	7.5R5/2	Extreme	2.5R4/4	Extreme	2.5R4/4	Extreme	7.5R5/2
E	Slight	5.0R3/4	Slight	5.0R3/4	Slight	2.5R4/4	Slight	2.5R3/4	Slight	2.5R3/4	Slight	10.0RP4/4
G	Slight	5.0R3/4	Slight	5.0R3/4	Slight	5.0R3/4	Slight	2.5R3/4	Slight	2.5R3/4	Appreciable	2.5R3/4
I	Appreciable	5.0R4/4	Appreciable	5.0R3/4	Extreme	5.0R1/1	Slight	2.5R3/4	Slight	2.5R3/4	Extreme	2.5R1/1
J	Slight	5.0R3/4	Slight	5.0R3/4	Extreme	5.0R1/1	Slight	2.5R3/4	Slight	2.5R3/4	Extreme	2.5R1/1

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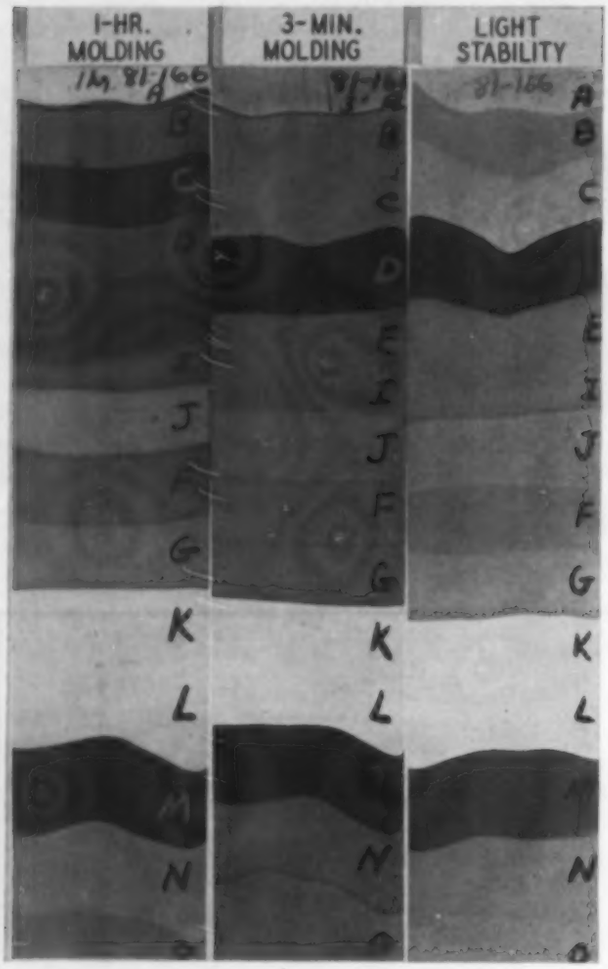
3—Effect of stabilizers and lubricants on the heat and light stability of colorant 6 (madder lake conc.)



Key to color changes in Fig. 3, above

Sect. Label	1-hr. molding		3-min. molding		Light stability	
	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.
A	Appreciable	7.5R5/12	Control	5.0R4/12	Appreciable	5.0R4/12
B	Appreciable	5.0R4/12	Appreciable	5.0R4/10	Slight	5.0R4/10
C	Appreciable	5.0R4/12	Appreciable	5.0R4/10	Slight	5.0R4/12
D	Appreciable	10.0R4P/.2	Extreme	10.0RP5/6	Extreme	2.5R4/10
E	Appreciable	5.0R3/12	Slight	5.0R4/12	Slight	5.0R5/12
I	Slight	5.0R4/12	Slight	7.5R4/12	Slight	7.5R4/12
J	Slight	7.5R5/10	Slight	7.5R4/12	Slight	7.5R5/12
F	Slight	5.0R4/12	Slight	5.0R4/.2	Slight	3.5R4/12
G	Slight	7.5R5/12	Slight	5.0R4/12	Slight	2.5R4/12
K	Extreme	2.5Y8/8	Extreme	2.5Y8/10	Extreme	2.5Y8/12
L	Extreme	2.5Y8/8	Extreme	2.5Y8/10	Extreme	2.5Y8/12
M	Extreme	2.5R3/10	Extreme	2.5R3/8	Extreme	2.5R4/12
N	Appreciable	7.5R5/12	Slight	5.0R4/12	Slight	5.0R4/12
O	Slight	5.0R4/12	Slight	5.0R4/12	Slight	5.0R4/12

One were milled on a 3 by 8-in. mill together with 0.18-gram portions of various stabilizers or lubricants. Milling temperatures were kept as low as possible in order to minimize color changes in this stage of the operation.

Temperature of front roll, °F.	260
Temperature of back roll, °F.	260
Speed of front roll, r.p.m.	20
Speed of back roll, r.p.m.	26
Total milling time, min.	5

Step Three. Small portions of the stocks from Step Two, each containing a different stabilizer or lubricant, were molded beside a control containing no stabilizer or lubricant. The several pieces flowed together at the edges and formed a continuous panel.

Table II.—Key to Materials Used in Test Formulas

Material	*Trade Name*
Resin	Marvinol VR-10 (polyvinyl chloride-type resin *(1)*[a]
Plasticizer	Di-2-ethylhexyl phthalate
Colorant	
1	A-8028 brilliant green toner *(2)*
2	"1094" pure Indian red *(3)*
3	"398" Indian red *(3)*
4	A4406 C.P. blue *(2)*
5	SP Victoria maroon (MB-11) *(4)*
6	X-686 madder lake conc. *(2)*
7	RT-533-D bon maroon lt. *(5)*
9	F-2969 yellow *(6)*
10	F-4818 med. red *(6)*
11	RT-539-D alkali resistant red *(5)*
12	RT-525-D bon red dark *(5)*
13	X-2028 Selkirk red *(2)*
14	X-1095 C.P. lithol toner medium *(2)*
15	Calco chrome yellow ZM *(7)*
16	X-1134 C.P. chromium oxide *(2)*
17	GP-501-D "Ramapo" green *(5)*
Stabilizer	
A	No stabilizer
B	Stabilizer V-I-N (an organic strontium salt) *(8)*
C	Stabelan "AG" *(9)*
D	Basic white lead carbonate *(10)*
E	Plumb-O-Sil B (a coprecipitated mixture of lead orthosilicate and silica gel) *(10)*
K	Stabilizer 53 (an organic phosphate salt) *(11)*
L	Stabilizer 85 (an organic phosphate salt) *(11)*
M	Vinyl stabilizer 3VE (basic lead hydroxynaphthenate) *(12)*
N	Stabilizer JCX (an organic cadmium salt) *(8)*
O	Vanstay 16 *(13)*
Lubricant	
A	No lubricant
H	Lithium stearate *(14)*
J	Aluminum stearate *(14)*
Lubricant-stabilizer	
F	Experimental material *(1)*
G	Cadmium stearate *(14)*
I	Lead stearate *(14)*
U	Cadmium stearate and phosphate-type light stabilizer *(1)*

[a]Numbers in italics give key to following list of manufacturers: *(1)* Chemicals Div.; The Glenn L. Martin Co., *(2)* Imperial Paper & Color Corp.; *(3)* Reichard-Coulston, Inc.; *(4)* Harmon Color & Chemical Co.; *(5)* E. I. du Pont de Nemours & Co., Inc.; *(6)* Ferro Chemical Corp.; *(7)* Calco Chemical Div., American Cyanamid Co.; *(8)* Advance Solvents & Chemical Corp.; *(9)* Stabelan Chemical Corp.; *(10)* National Lead Co.; *(11)* Victor Chemical Works; *(12)* The Flintkote Co.; *(13)* R. T. Vanderbilt Co., Inc.; *(14)* Witco Chemical Co.

The molding frame was made of aluminum and was 13.5 by 2.5 by 0.04 inches. The moldings were for 3-min. and 1-hr. cycles at 315° F., and 1000 p.s.i.

Step Four. From Step Three, portions of the stock were taken and subjected to the following tests:

Migration test. The 3-min. molded sheet was pressed against a similar sample of uncolored stock, containing 15 parts Titanox per 100 parts resin, at 0.55 p.s.i. pressure for 48 hr. at 180° F. Migration was evident if any color was transferred to the white sample. (*Please turn to page* 104)

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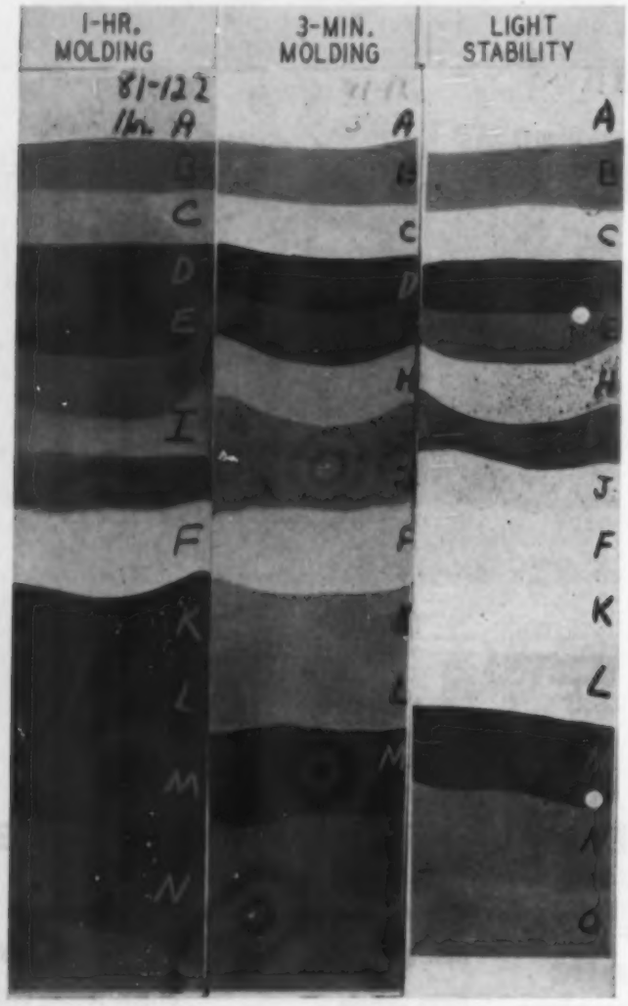
Heat stability test. Samples of the 3-min. and 1-hr. moldings from Step Three were compared visually. The degree of color change was taken as a direct indication of the heat stability. The effects of various stabilizers and lubricants were also determined from the above samples.

Light stability test. Portions of the 3-min. moldings from Step Three were exposed to ultra-violet light in an Atlas Twin-Arc Weather-Ometer. Except where otherwise noted, all exposures were for a period of 200 hours. The light stability was determined from the degree of color change and the effect of stabilizer or lubricant was noted.

4—Effect of stabilizers and lubricants on the heat and light stability of colorant 5 (Victoria maroon)



Key to color changes in Fig. 4, above

Sect. Label	1-hr. molding: ASTM D 620-45T	1-hr. molding: Munsell Color No.	3-min. molding: ASTM D 620-45T a	3-min. molding: Munsell Color No.	Light stability: ASTM D 620-45T	Light stability: Munsell Color No.
A	Extreme	2.5R3/10		7.5RP 4/10	Extreme	7.5RP6/4
B	Slight	2.5R3/8		2.5R3/10	Slight	2.5R4/10
C	Appreciable	5.0R3/12		5.0R4/10	Appreciable	10.0RP4/8
D	Slight	5.0RP3/4		7.5R13/6	Slight	5.0RP3/6
E	Slight	2.5R2/8		10.0RP3/8	Slight	2.5RP4/8
H	Appreciable	2.5R3/12		2.5R3/10	Appreciable	5.0R3/10
I	Appreciable	2.5R3/12		2.5R3/8	Appreciable	10.0P3/6
J	Slight	2.5R3/10		2.5R3/8	Appreciable	2.5R4/8
F	Appreciable	10.0RP 4/12		2.5R3/10	Extreme	7.5R3/10
K	Extreme	2.5R3/6		2.5R4/10	Extreme	10.0P5/10
L	Extreme	2.5R3/6		2.5R3/10	Appreciable	5.0RP4/10
M	Slight	5.0RP4/6		5.0RP3.6	Slight	2.5RP4/4
N	Extreme	5.0R2/2		10.0RP3/8	Slight	2.5RP3/10
O	Slight	2.5R3/10		10.0RP3/8	Slight	7.5RP3/8

a Since the color of the control section A was considerably bleached in the 3-min. molding, it is not considered a valid control. For color changes according to ASTM D620-45T, each section of the 3-min. molded panel is considered the reference color for the corresponding section in the other two panels. For example, the color of the 3-min. molded section containing stabilizer B is used as a reference color for comparison with the 1-hr. molding and the light-exposed section which also contain stabilizer B.

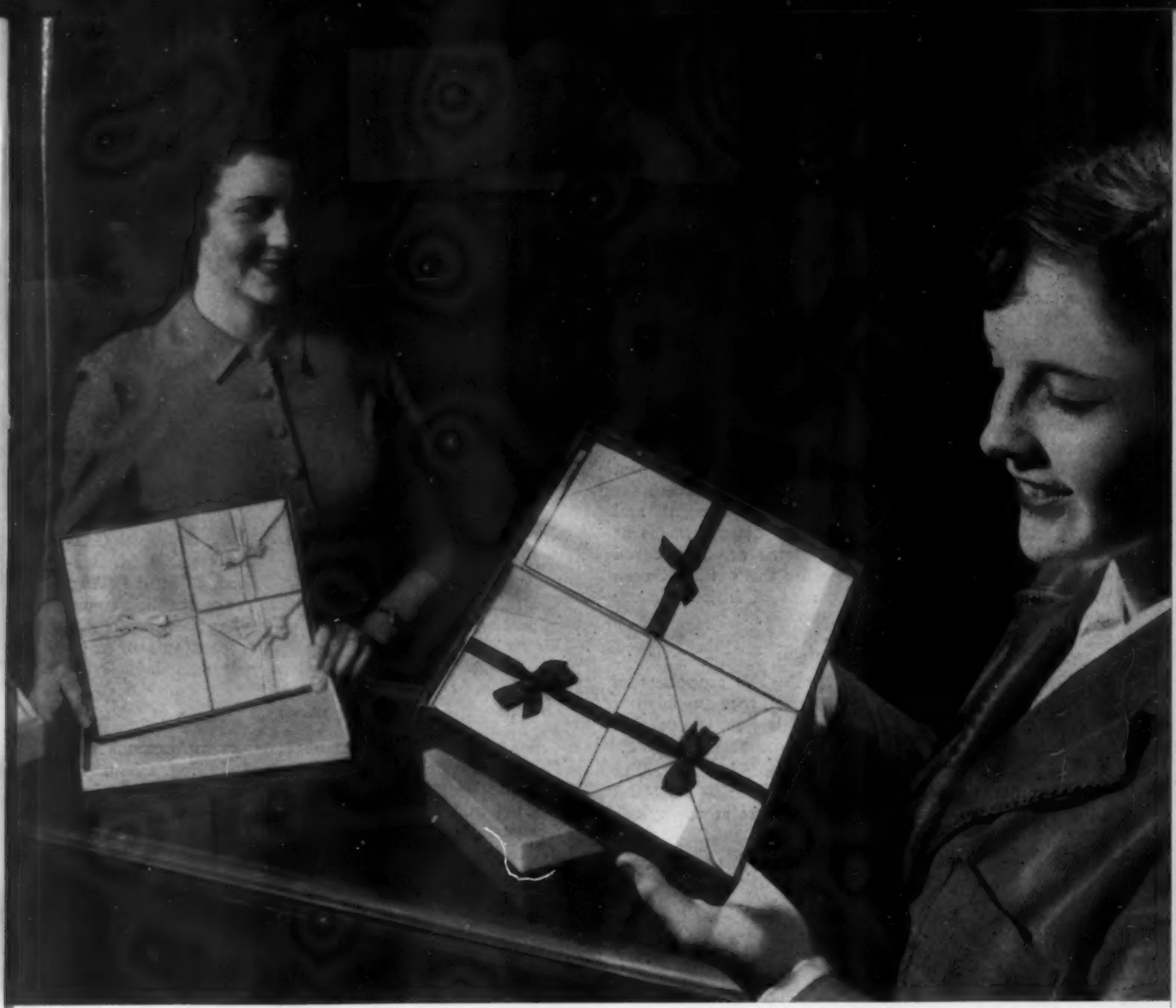
Results of tests

The photographs reproduced were selected to demonstrate the most important results of this work. Each of Figs. 1, 2, 3, 4, 5, 7, 8, and 9 shows at least one plastic test panel in which top section (labeled "A") contains no stabilizer or lubricant while sections below it contain various stabilizers, lubricants, or stabilizer-lubricants according to the letters appearing on the sections. The top section of the 3-min. molded panel (labeled "A") can be considered a control except in cases where the color was so unstable that it tended to bleach even in the 3-min. molding. In this case an unbleached control color cannot be obtained and it becomes important to note which materials have produced a useable color and a color which is stable both to light and heat. Cases of this kind are noted in the discussions which follow.

Color changes in the various plates have been rated by two methods, ASTM D 620-45T and Munsell color number. These ratings are shown in the tabulations accompanying Figs. 1 through 10. Although the ASTM method of rating the relative amount of color change was employed, the apparatus for exposure to light which is also specified in that method was not employed.

The rating of color changes by Munsell color number is more definitive than the ASTM rating. The Munsell concepts of hue (name of the color), value (lightness or darkness), and chroma (intensity—whether it is weak or strong, dull or vivid) are directly related, respectively, to the I. C. I. concepts of dominant wave length, luminous reflectance, and purity. In the "Munsell Book of Color" (Munsell Color Co., Inc.), each colored sheet is identified with a number and letter for the hue, a number for the value, and a number for the chroma of the color. The first portion of a Munsell color number, for example 5.0 RP, defines the hue of a color, in this case a reddish purple. The last portion of a Munsell color number, for example 7/6, defines the value and chroma, the numerator being the value and the denominator the chroma. An increasing number for a given hue indicates a clockwise shift around the hue circle, for example, a change from 5.0 R to 10.0 R indicates a shift from red toward yellow. An increase in a value number indicates a lightening of the color. An increase in a chroma number indicates an increase in purity or intensity of the color. Munsell color numbers which are closest to the color of the material in question are chosen. Therefore, very slight color changes in these plastic panels do not always involve a change in Munsell color number.

These color panels demonstrate the following points: (*Please turn to page* 140)



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PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed

Materials

DEVELOPMENT OF EQUIPMENT FOR ALKYD RESINS MANUFACTURE. A. G. Hovey. Ind. Eng. Chem. *41*, 730-7 (Apr. 1949). Progress in alkyd resin equipment is traced from the early days to the present. Kettle construction and plant layouts are considered more from the management and operational point of view rather than from actual details of present fabrication. Most of the fundamental points in alkyd resin equipment have been developed one at a time by the varnish men in the past three decades, although only comparatively recently integrated into modern streamlined equipment and engineering designs. The merits and disadvantages of different heating and cooling systems are considered as well as parts and accessories for the kettles. Seven precautions against the development of dark color are given; 34 references.

VINYL-NITRILE BLENDS. G. E. Field. Modern Packaging *22*, 149-50, 190, 193 (Dec. 1948). The properties of polyvinyl chloride/butadiene acrylonitrile copolymer blends are described. Mixtures of this type are used to make the oleomargarine squeeze-pouches.

POLYTETRAFLUOROETHYLENE. British Plastics *20*, 580-1 (Dec. 1948). The properties of polytetrafluoroethylene are reported.

Molding and fabricating

INJECTION MOLDING OF NYLON. L. Paggi. SPE News *4*, 11-12 (Dec. 1948). The design of dies for the injection molding of nylon is described. Particular attention is given to the design of the nozzle.

EMPIRICAL FACTORS IN INJECTION MACHINE DESIGN. A. R. Morse. SPE News *5*, 3, 5, 7, 9, 11, 13, 25-6, 29 (Jan. 1949). Various factors concerned in the design of injection molding machines are discussed. A bibliography is included.

HOT AIR PREHEATING OF COMPRESSION MOLDING POWDERS. R. D. Beck. SPE News *5*, 2-4, 12 (Feb. 1949). Equipment and technique for preheating thermosetting molding materials with hot air are described. The process is not costly and the moldings have good physical properties.

Applications

PHOTOELASTICITY. H. T. Jessop. British Plastics *20*, 513-18 (Nov. 1948). The use of cast phenolic and allyl resin photoelastic materials for study of stress distribution is discussed.

PLASTICS MODELS. A. E. Javitz. Electrical Manufacturing *43*, 112-17, 178, 180, 182 (Feb. 1949). The uses of plastics models in developing or perfecting a device are discussed. These include transparent working models for visual studies of functional and structural elements, inexpensive models for experimental tests, and photoelastic resin models for stress analysis.

NEW FORM OF NYLON. British Plastics *20*, 511-12 (Nov. 1948). A nylon film is used in surgical dressings. This polymer has the requisite physical, chemical, permeability, tolerance, and bacteriological properties for this application.

Properties

TRANSPORT AND EQUILIBRIUM PHENOMENA IN GAS-ELASTOMER SYSTEMS. I. KINETIC PHENOMENA. R. M. Barrer and G. Skirrow. J. Polymer Science *3*, 549-63 (Aug. 1948). The effects of systematic alterations in the amount of cross linking in natural and butyl rubbers upon diffusion coefficients and permeability constants of various hydrocarbons and nitrogen are reported.

Chemistry

STABILITY OF HIGH POLYMER LATEXES TO ACIDIFICATION. R. S. Barrows and G. W. Scott. Ind. Eng. Chem. *40*, 2193-6 (Nov. 1948). Acidification is necessary to reduce the pH and to facilitate coagulation of high polymer latexes in which alkaline agents have been used as dispersing agents. When the alkaline soaps are neutralized complete coagulation sometimes occurs and to offset this result acid-stable dispersing agents must be incorporated into the latex. The apparatus and procedure for the evaluation of the dispersing agents are given and the results of the addition of stabilizing agent after polymerization and polymerization in presence of the stabilizing agent are discussed. The commonly used agent is the condensation product of formaldehyde and naphthalenesulfonic acids. The effectiveness of the 1- and 2- isomer of napthalenesulfonic acid as dispersing agents and the method of calculating the cross-sectional area of a dispersing agent from the molecular dimensions and Avogadro's number are also presented in this article.

POLYVINYL CHLOROACETATE. R. H. Wiley and G. M. Brauer. J. Polymer Sci. *3*, 708-13 (Oct. 1948). Bulk and solution polymerizations of vinyl chloroacetate show that the properties of the polymer vary widely with variation in polymerization conditions. The highest viscosity polymer, intrinsic viscosity of 1.32, is prepared by bulk polymerization with 0.028% benzoyl peroxide initiator at 70° C. At polymerization temperatures over 70° C. and at catalyst concentrations over 0.14%, the polymer is discolored, insoluble, or has relatively poor aging characteristics. Polymerization in an equal volume of methyl isobutyl ketone at 80° C. and with 0.013% benzoyl peroxide gave 93% yield of polymer of intrinsic viscosity 0.15. In nitrobenzene, toluene, trichloroethylene, or ethyl acetate, only traces of polymer are obtained. In carbon tetrachloride, unstable telomers are produced.

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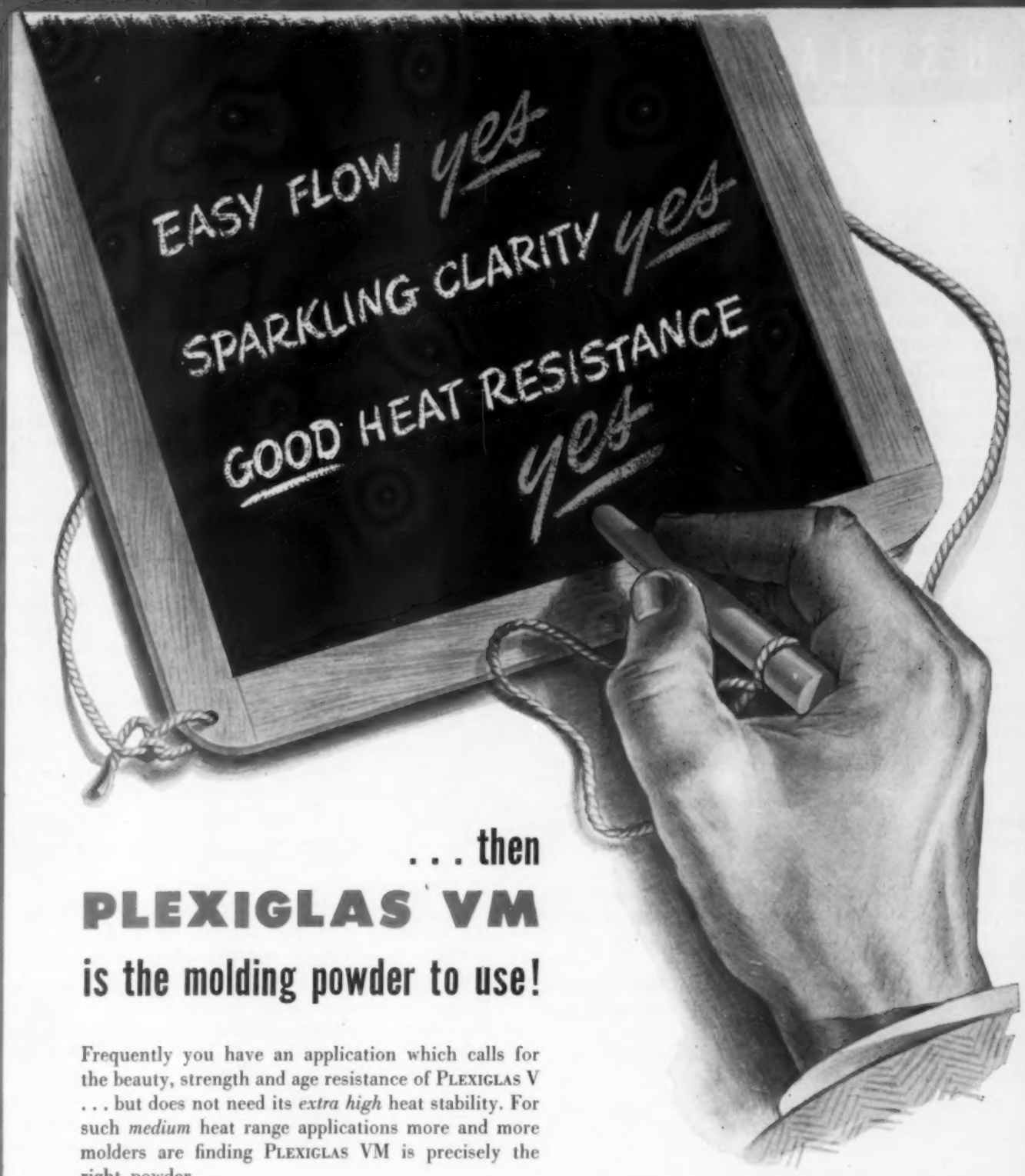

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U.S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

POLYSTYRENE. S. E. Glick (to Monsanto). U. S. 2,456,558, Dec. 14. Aromatic vinyl compounds are mass-polymerized under the influence of various stages of heat reaction.

POLYVINYL CHLORIDE. H. F. Park (to Monsanto). U. S. 2,456,565, Dec. 14. Polyvinyl chloride stabilized with tri-parachlorophenylstibine.

TEXTILE TREATMENT. M. J. Scott and S. H. Rider (to Monsanto). U. S. 2,456,568, Dec. 14. Resins prepared by reacting a monohydric alcohol ether of methylol melamine with thiourea and formaldehyde.

POLYTETRAFLUOROETHYLENE. A. J. Cheney (to Du Pont). U. S. 2,456,621, Dec. 21. Wire is coated with polytetrafluoroethylene by prebaking finely ground polymer and simultaneously introducing polymer and wire through a die and extruding.

POLYSILOXANES. C. D. Doyle (to G. E.). U. S. 2,456,627, Dec. 21. Adding a mixture of hydrocarbon siloxanes to an hydrolysis medium consisting of water and an ether solvent.

FURFURYL ALCOHOL. A. P. Dunlop and E. A. Reineck (to Quaker Oats). U. S. 2,456,628, Dec. 21. A thermosetting resin prepared by reacting resorcinol and a partial condensate of furfuryl alcohol with itself.

RESINS. G. B. Gehrenbeck (to Minnesota Mining and Mfg. Co.). U. S. 2,456,629, Dec. 21. Synthetic resin made by preparing a tung oil-maleic anhydride adduct, esterifying with mannitol, and reacting sulfuryl chloride with the ester.

ACRYLIC ESTERS. C. E. Rehberg and C. H. Fisher (to U. S.). U. S. 2,456,647, Dec. 21. An unsaturated resin prepared by copolymerizing an alkenyl acrylate with a lower alkyl ester of acrylic acid in the presence of a polymerization regulator.

ACETYLENE TETRAMETHACRYLATE. J. O. White (to Du Pont). U. S. 2456,759, Dec. 21. Acetylene tetramethacrylate and polymers thereof.

MOLDING. J. E. Gilchrist. U. S. 2,456,778, Dec. 21. Injection molding apparatus.

SILICON POLYMERS. J. F. Hyde (to Corning Glass Works). U. S. 2,456,783, Dec. 21. A copolymeric organosiloxane.

WATER RESISTANT RESINS. L. Coes, Jr. (to Norton). U. S. 2,456,919-20-21, Dec. 21. A composite capable of curing to a water-resistant mass, comprising aniline-formaldehyde resin, a polyglycol dichloride and a metal such as lead, iron, zinc, or copper or metal oxides or a salt such as sodium silicate or zinc borate.

POLYVINYL CHLORIDE. J. R. Darby (to Monsanto). U. S. 2,457,035, Dec. 21. A composition of vinyl resin, the bulk of which is polyvinyl chloride, a basic lead salt, and an ester of monalkyl meleate or fumarate.

GOLF CLUB. E. P. Kearsley and E. J. Marciniak (to A. G. Spalding and Bros.). U. S. 2,457,084, Dec. 21. A golf club head of molded ethyl cellulose.

SEALING AGENT. S. S. Kurtz, Jr. and J. S. Sweely (to Sun Oil). U. S. 2,457,160, Dec. 28. Reacting 1 mol phenol with 4 mols formalin in presence of catalyst until resin precipitates, and dispersing in water.

RESINOUS COMPOSITIONS. W. B. Clark (to Du Pont). U. S. 2,457,209, Dec. 28. A thermosetting composition comprising formaldehyde-modified polymethylenediamine-carbon bisulfide reaction product.

POLYETHYLENE. E. Hunter and R. B. Richards (to I. C. I.). U. S. 2,457,238, Dec. 28. Solid polyethylene is dissolved in ethylene gas under pressure at 50 to 350° C., and layers of different molecular weight are separated upon blowing-down the mixture.

POLYVINYL ACETAL. G. O. Morrison, F. P. Lossing, A. H. Heatley, and J. F. L. M. Germain (to Shawinigan Chemicals). U. S. 2,457,261, Dec. 28. Process for preparing polyvinyl acetal resin.

POLYMERS. P. S. Pinkney (to Du Pont). U. S. 2,457,271-9, Dec. 28. Reacting olefin-carbon monoxide polymers with an alkali or alkaline earth metal in solvent solution, and precipitating with water.

POLYMERS. A. B. Boese, Jr. (to Carbide and Carbon). U. S. 2,457,300, Dec. 28. Polymers of glycidyl sorbate.

HEXADIENE POLYMERS. H. Dreyfus (to Celanese). U. S. 2,457,306, Dec. 28. Manufacture of polycyclic resins by heating hexadiene-1,5 in the presence of a catalyst.

AMINOPLASTS. M. J. Scott (to Monsanto). U. S. 2,456,404-5-6, Dec. 28. Resinous heat reaction products of aminotriazine-aldehyde condensates with nitroparaffins or halinotroparaffins.

PHENOL-ALDEHYDE RESINS. D. V. Redfern (to American Marietta). U. S. 2,457,493, Dec. 28. Method of producing a water-soluble phenol-aldehyde condensate.

VENEER TUBES. J. J. Snoke. U. S. 2,457,504, Dec. 28. Wrapping veneer plywood around a mandrel with a thermosetting adhesive between the plies, applying a flexible sleeve over the plies, exhausting air from the sleeve and heating in an autoclave.

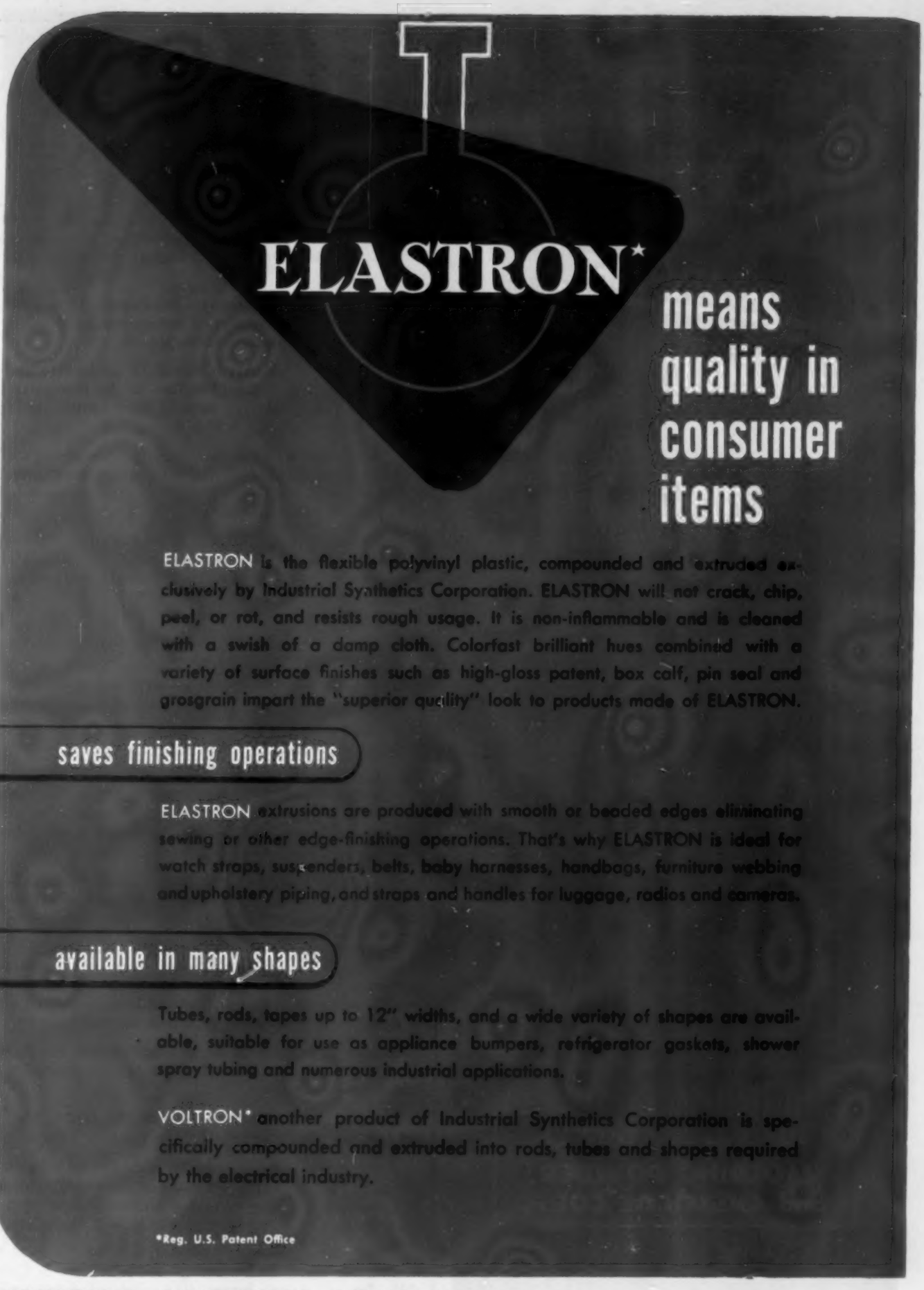
POLYSILOXANES. J. R. Elliott and R. H. Krieble (to G. E.). U. S. 2,457,539, Dec. 28. A preformed methylpolysiloxane is treated with alkaline solution to increase molecular weight.

LINOLEUM COVERING. P. O. Powers (to Armstrong Cork). U. S. 2,457,600, Dec. 28. Linoleum-like wall covering comprising linoleum cement, filler, a siccative oil, a cellulose ether, and a high-melting resin.

POLYVINYL BORONATES. P. S. Salzberg and F. K. Signaigo (to Du Pont). U. S. 2,457,603, Dec. 28. A polyvinyl ester of an organo-boronic acid.

IMPREGNANT. S. E. Glick (to Monsanto). U. S. 2,457,657, Dec. 28. A polymerizable mixture of styrene and diethylene glycol, maleic acid, linseed oil acids condensate used for impregnating porous metal castings.

(*Please turn to page* 110)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VINYL ETHERS. F. Grosser (to General Aniline). U. S. 2,457,661, Dec. 28. A vinyl ether polymerized by reacting with gallium trichloride.

POLYSILOXANES. J. F. Hyde (to Corning Glass). U. S. 2,457,677, Dec. 28. Liquid organopolysiloxanes.

HOLLOW ARTICLES. W. H. Kopitke (to Plax). U. S. 2,457,687, Dec. 28. Apparatus for forming hollow articles of organic plastic material.

METHYL SILOXANES. R. H. Krieble and J. R. Elliott (to G. E.) U. S. 2,457,688, Dec. 28. Solid, curable, elastic composition obtained by condensing a monomethylsiloxane and copolymerized trimethyl and monomethyl siloxanes.

AMINOPLASTS. M. J. Scott (to Monsanto). U. S. 2,457,738, Dec. 28. A thermoplastic condensate of di-alkylol melamine and a *p*-substituted phenol.

INTERPOLYMER. J. S. Arvin and W. B. Gitchel (to Sherwin-Williams). U. S. 2,457,768, Dec. 28. An interpolymer of styrene, an oil-soluble natural resin containing free carboxylic acid groups, and a drying oil.

FLOOR COVERING. W. Stubblebine (to Armstrong Cork Co.). U. S. 2,457,848, Jan. 4. A floor covering comprising alcohol-soluble phenol-modified coumarone-indene resin, and a cellulose ether.

POLYMERIZATION. J. D. Surmatis (to G. J. Esselen). U. S. 2,457,850, Jan. 4. Polymethacrylic acid esters are prepared by heating an ester of methacrylic acid and a saturated alcohol in the presence of sulfuric acid and glacial acetic or propionic acid.

COPOLYMERS. G. F. D'Alelio (to Pro-phy-lac-tic). U. S. 2,457,872-3, Jan. 4. Vulcanizable copolymers of a vinyl aryl compound, butadiene, and maleic esters.

MOLDING. F. C. George (to F. C. George Machine). U. S. 2,457,996, Jan. 4. A rodding attachment for a plastic mold machine.

ELASTOMER. I. B. Johns (to Iowa State College Research Foundation). U. S. 2,458,001, Jan. 4. Elastomer prepared by passing hydrogen through furfural to saturate the hydrogen and passing the vapor mixture over heated reduced copper hydroxide catalyst.

CEMENTING. E. Simon and M. F. George (to Lockheed Aircraft). U. S. 2,458,032, Jan. 4. Method of repairing damaged methacrylate resin sheet.

PRESSURE-SENSITIVE ADHESIVE. H. N. Homeyer, Jr. (to Kendall). U. S. 2,458,166, Jan. 4. A pressure-sensitive adhesive sheet, the adhesive being pressure-sensitive rubber adherent to one surface and being protected with a thin film of a material repellent thereto.

RESINS. P. L. Nichols, Jr. and L. T. Smith (to U. S.). U. S. 2,458,191, Jan. 4. Allyl starch is incorporated with vinyl-type resins.

MOLDING. R. O. Wood. U. S. 2,458,327, Jan. 4. Method of molding plastic articles having metallic inserts.

COPOLYMERS. G. F. D'Alelio (to Pro-phy-lac-tic). U. S. 2,458,352, Jan. 4. Moldable composition comprising a liquid nitroalkane and a polymerization product of a mixture of a diene, acrylonitrile, and diethyl maleate.

COPOLYMERS. J. B. Dickey (to Eastman). U. S. 2,458,355, Jan. 4. A copolymer of conjugated diene and a vinyl compound. (*Please turn to page* 113)

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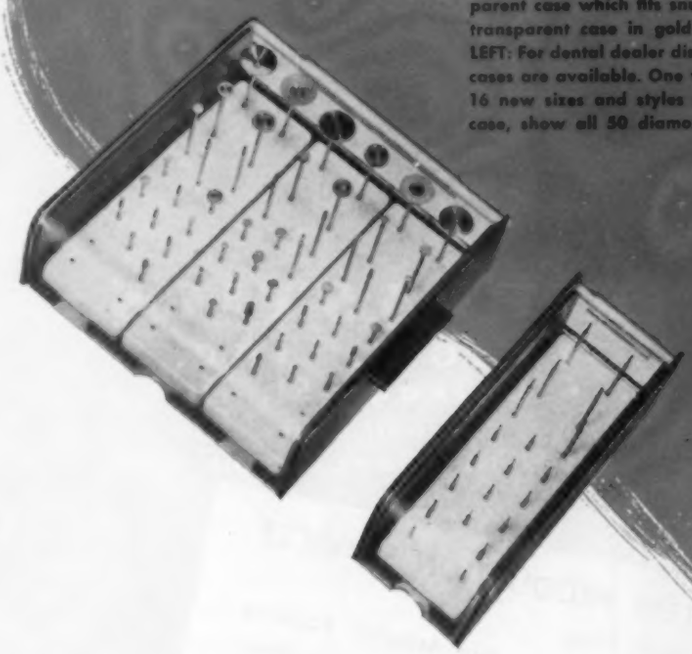

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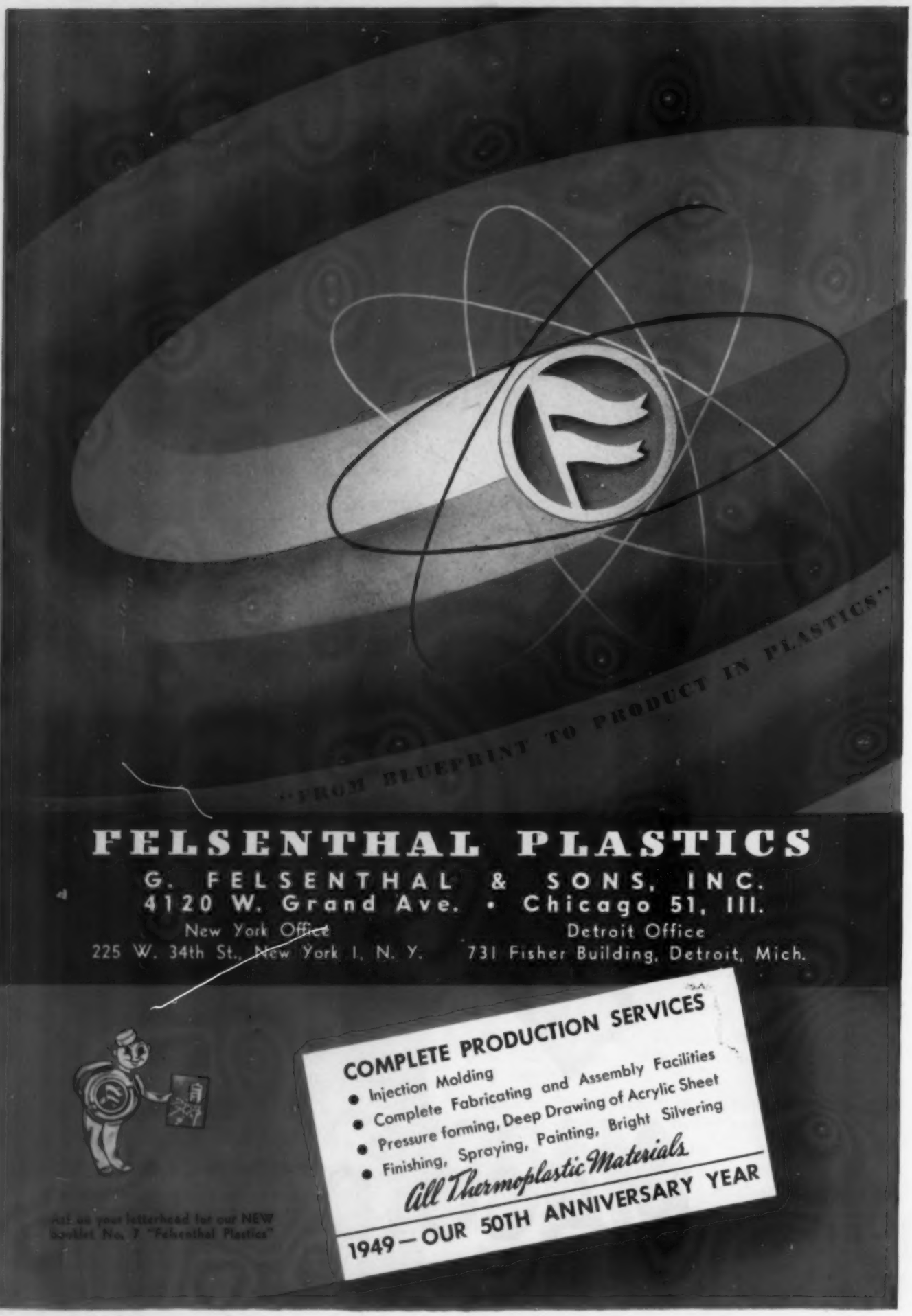

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RESIN. G. R. Owens (to Monsanto) U. S. 2,458,408, Jan. 4. Heating together phenol, acrolein, and an aqueous solution of an acid.

RESINS. D. D. Reynolds and W. O. Kenyon (to Eastman). U. S. 2,458,420-1, Jan. 4. Acrylic ester-amides and polymers thereof; unsaturated derivatives of ethylene diamine and polymers thereof.

RESINS. D. D. Reynolds and J. H. Van Campen (to Eastman). U. S. 2,458,422-3, Jan. 4. Acrylic diester-propionamides and polymers thereof; N-allyl derivatives of acrylic ester amides and polymers thereof.

COATINGS. M. Salo (to Eastman). U. S. 2,458,428, Jan. 4. A non-blocking coating containing cellulose acetate butyrate, di-2-ethylhexyl phthalate, a wax, and polyvinyl acetate.

NON-THERMOPLASTIC FILM. G. T. Vaala (to Du Pont). U. S. 2,458,451, Jan. 4. Sheet material comprising polyvinyl butyral resin with a melamine-formaldehyde condensate is heated to render it non-thermoplastic.

COPOLYMERIZATION. I. L. Wolk (to Phillips Petroleum). U. S. 2,458,456, Jan. 4. Process for continuous emulsion polymerization of an olefin and a conjugated diolefin.

MOLDING MATERIAL. J. S. Clark (to American Viscose). U. S. 2,458,562, Jan. 11. Molding composition of cellulose ether, rubber, a vulcanizing agent, and other solids.

POLYMER PREPARATION. L. Plambeck, Jr. (to Du Pont). U. S. 2,458,636, Jan. 11. Precipitation of ethylenic polymer from aqueous emulsion.

VINYL COPOLYMER. R. W. Quarles (to Carbide and Carbon). U. S. 2,458,639, Jan. 11. A copolymer of vinyl chloride, vinyl acetate, maleic acid, methyl maleate, and polyvinyl alcohol.

POLYMERIZATION. E. E. Fleck (to U. S.). U. S. 2,458,772, Jan. 11. Resin formed by heating a mixture of *l*-pimaric acid maleic anhydride adduct and glycerol.

RUBBER SOFTENER. N. M. Elmore and A. M. Gessler (to Standard Oil Development). U. S. 2,458,841, Jan. 11. Dissolving polyisobutylene in a chlorine resisting solvent and treating with sulfur dioxide and chlorine in the presence of ultra-violet light.

GOLF CLUB. R. F. Wheeler and E. J. Marciniak (to A. G. Spalding). U. S. 2,458,920, Jan. 11. A golf club head of molded plastic.

POLYMERS. J. F. Hyde (to Corning Glass). U. S. 2,458,-944, Jan. 11. Organo-siloxanes.

YARN. R. J. Smith (to I. C. I.). U. S. 2,459,052, Jan. 11. Yarns of a linear polyester of a terephthalic acid and a glycol are sized with an aqueous solution of partially hydrolyzed polyvinyl acetate and a water soluble condensate of an alkylolurea.

CARBOHYDRATE DERIVATIVES. J. Lolkema (to U. S.). U. S. 2,459,108, Jan. 11. Adhesive alkyl ethers of a gelatinizable carbohydrate soluble in water.

STYRENE DERIVATIVES. A. F. McKay (to Dominion Tar and Chemical). U. S. 2,459,109, Jan. 11. Alkyl substituted styrene polymers are prepared by reacting acetylene with an alkylated benzene in the presence of a stable aliphatic ether-boron trifluoride complex in the presence of a mercury salt.

FILM. La V. E. Cheyney (to Wingfoot). U. S. 2,459,-125, Jan. 11. A homogeneous film of blended copolymer of vinyl chloride and vinylidene chloride and a resin

You'll say it's amazing . . at extremely low per unit cost, we precision-turn thermoplastic and thermosetting extruded, cast or laminated rod stock into any concentric shape you require—tapers, chamfers, contours, threads, necks, stems. Working with square, hexagonal or round plastics, either hollow or solid, we produce parts as long as 20 feet, hold them to ±.001". No burnishing or polishing is needed. Each piece is turned to exact diameter, cut-off to exact length—ready to use

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MOLDERS OF MOST PLASTICS BY MOST METHODS

such as polyvinyl chloride or a copolymer of vinyl chloride and a mono-olefin.

COPOLYMERS. A. M. Clifford (to Wingfoot). U. S. 2,459,126, Jan. 11. Synthetic rubber prepared by polymerizing in aqueous emulsion, a mixture of acrylonitrile and a cracked petroleum fraction.

VINYL RESINS. F. W. Cox and J. M. Wallace, Jr. U. S. 2,459,127, Jan. 11. Color stabilizers for vinyl halide resins copolymerized with a mono-olefinic compound, comprising zirconium oxide.

RESINS. A. O. Zoss (to General Aniline). U. S. 2,459,-137, Jan. 11. Resinous condensates prepared by reacting acetylene under pressure with alkyl substituted phenols in the presence of an alkali metal compound.

WEB COATING. W. H. Holst and G. R. Hersam. U. S. 2,459,164, Jan. 18. A webbable, strippable coating of vinyl chloride-acetate copolymer, vinylidene chloride-acrylonitrile copolymer, plasticizer, and solvent.

ALKYD MATERIAL. C. G. Moore (to Glidden). U. S. 2,459,176, Jan. 18. Mixing a monoglyceride of a drying or semi-drying acid with maleic anhydride and heat polymerizing.

MOLD. L. A. Wells and C. A. Halbkat, U. S. 2,459,205, Jan. 18. A mold for making plastic artificial eyes.

AMINO CELLULOSE DERIVATIVES. J. D. Guthrie (to U. S.). U. S. 2,459,222, Jan. 18. Amino groups are introduced into cellulose by treating with aqueous sodium hydroxide and 2-aminoethylsulfuric acid, heating, and washing.

SEALING APPARATUS. R. McDowell (to Visking). U. S. 2,459,234, Jan. 18. Apparatus for flame-sealing thin-walled thermoplastic tubing.

COATING. R. W. Holden (to Laminating Specialties). U. S. 2,459,279, Jan. 18. Laminated article prepared by coating a flat or contoured platen with a polyester base resin, pre-jelling with ultra-violet light, bringing a base into contact with the exposed surface, heating under pressure, and finally stripping off the platen.

FILLER GUN. W. E. Smith. U. S. 2,459,296, Jan. 18. A gun for applying plastic material.

PLASTIC COMPOSITION. P. Stamberger. U. S. 2,459,298, Jan. 18. A plastic composition comprising a cellulose ester or ether plasticized with a vulcanized polyethylene glycol ester of an unsaturated fatty acid.

ORGANOSILICOLS. R. R. McGregor and E. L. Warwick (to Corning Glass). U. S. 2,459,387, Jan. 18. Organosilicols are condensed by dehydrating in the presence of boron trifluoride.

POLYMERS. J. G. Lichty and N. V. Seeger (to Wingfoot). U. S. 2,459,439, Jan. 18. A solid rubbery polymer comprising the reaction product of an acrylic acid with an organic diisocyanate.

POLYVINYL ACETALS. K. F. Beal and C. J. B. Thor (to Visking). U. S. 2,459,488, Jan. 18. A thermoplastic polyvinyl acetal comprising the reaction product of a polyvinyl alcohol and a lower alkoxy acetaldehyde.

OLEFIN POLYMERS. J. M. Coon and J. B. Rust. U. S. 2,459,501, Jan. 18. Polymers prepared by reacting a mixture of a mono-isoolefin and an unsaturated aliphatic alcohol ester of an unsaturated dicarboxylic acid in the presence of a Friedel-Crafts catalyst.

K-Jet, Kenton Plastics' version of the original sketch—an up-to-the-minute toy designed to appeal to modern youngsters

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It started with a Hercules design sketch for a new and different toy. Collaboration of designer and manufacturer translated the original idea intact into an attractive, sales-compelling product—the K-Jet shooting toy, molded with tough, colorful cellulose acetate by Kenton Plastics Corporation. Designed right, with the proper plastic, it sells on sight . . . another example of the advantages of sound product planning with the versatile cellulosics.

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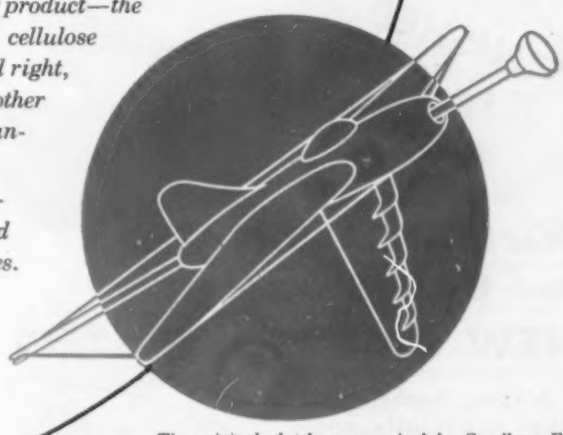

The original sketch as conceived by Sundberg-Ferar

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Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant, for transfer to other plants of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

The figures for sales given in the present report are not comparable with those for consumption in

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled by

Materials	*Total prod'n first 3 mos. 1949*
CELLULOSE PLASTICS:[a]	
Cellulose acetate and mixed ester plastics:	
Sheets, continuous:	
Under 0.003 gage	2,109,906
0.003 gage and over	1,878,674
All other sheets, rods, and tubes	920,415
Molding and extrusion materials	12,947,231
Nitrocellulose:	
Sheets	1,809,274
Rods and tubes	420,610
Other cellulose plastics[b]	2,683,646
PHENOLIC AND OTHER TAR ACID RESINS:	
Laminating	10,164,321
Adhesives	5,619,020
Molding materials[a]	34,928,586
Protective coatings (containing less than 10% modifier)	4,575,669
Miscellaneous uses, including casting	11,399,515
UREA AND MELAMINE RESINS:	
Adhesives	8,912,551
Textile- and paper-treating resins	7,245,820
Protective coatings, modified and unmodified	4,178,330
Miscellaneous uses, including laminating and molding[c]	15,114,408
STYRENE AND STYRENE DERIVATIVE POLYMER AND COPOLYMER RESINS:	
Molding materials[a]	38,833,293
Miscellaneous uses[d]	6,174,307
VINYL RESINS:	
Sheeting and film, including safety-glass sheeting[b]	31,352,588
Adhesives (resin content)	2,242,936
Textile- and paper-treating resins, including spreader and calendering types (resin content)	7,210,083
Molding materials (resin content)	18,063,224
Miscellaneous uses (resin content)[d]	4,882,159
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:	
Molding materials[a,f]	9,267,208
Protective coatings[e]	10,732,517
All other uses[b]	41,915,705

[a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Excludes data for protective coatings. These data are included with miscellaneous coatings to avoid disclosure of the operations of individual companies. [e] Statistics include data for virtually all major manufacturers of protective coating resins. The coverage in this report

Plastics Materials

the producing plants plus shipments to other plants given in earlier reports. The figures for production given in the present report, however, would be comparable with figures for consumption in producing plants plus shipments given in earlier reports except for inventory changes. From month to month these changes in inventory may be substantial, but over several months they tend to even out.

IN POUNDS FOR FEB. AND MAR. 1949
U. S. Tariff Commission

February 1949		*March 1949*	
Production	*Sales*	*Production*	*Sales*
671,809	553,151	589,660	496,251
563,331	564,160	645,356	643,954
285,653	211,257	327,565	289,709
4,322,490	3,974,501	4,547,696	4,174,449
562,357	506,191	622,939	564,904
128,751	139,849	105,495	138,205
889,703	923,061	1,009,580	1,043,364
3,130,391[1]	1,773,271[1]	3,293,187	1,773,337
1,886,925	1,684,801	1,897,274	1,528,649
11,268,217[1]	8,697,914[1]	11,741,123	9,214,785
1,427,916[1]	1,066,978[1]	1,441,595	823,357
3,909,594[1]	3,893,899[1]	3,556,654	4,400,575
2,901,674	2,742,796	3,142,655	3,127,220
2,331,235	1,597,362	2,391,638	1,480,804
1,242,496[1]	861,942[1]	1,412,242	997,793
5,408,573[1]	3,999,110[1]	4,229,413	3,235,623
12,961,092	12,398,052	14,984,375	15,439,420
1,958,806	1,423,883	2,272,936	1,994,296
9,368,322	10,248,665	11,786,984	11,909,960
571,463	666,708	815,018	896,459
1,978,981	2,076,521	2,384,398	2,447,442
5,569,187	5,506,144	5,660,255	4,856,478
1,576,738	976,588	1,572,211	895,588
2,882,552[1]	2,691,524	3,131,825	2,934,129
3,213,351[1]	2,964,277[1]	3,450,624	3,628,115
14,212,311	13,988,547	12,840,845	12,457,064

is about 90% complete, based on final returns for the year 1947. [f] Includes data for acrylic aniline-formaldehyde, polyethylene, nylon, and other molding materials. [g] Includes data for coumarone-indene, petroleum polymer and condensation, silicone, and other protective coating resins. [h] Includes data for acrylic, alkyd, coumarone-indene, nylon, petroleum polymer and condensation, silicone, and other plastics and resins for miscellaneous uses. [i] The totals given here have been revised from first reports.

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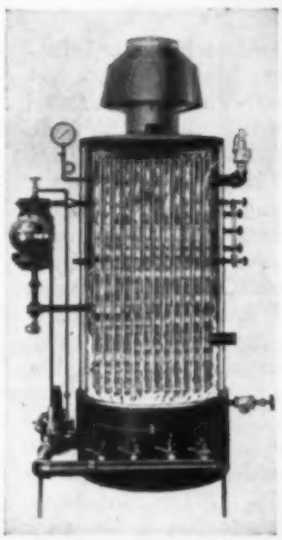

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Engineered Steam at its best with four decades of experience at your disposal — so, send your steam problem to us for study and recommendation.

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NEW MACHINERY AND EQUIPMENT

Preheater—Model 15R, a high frequency dielectric heating unit for preheating large plastic and rubber preforms, is announced by the Thermex Div., The Girdler Corp., 224 E. Broadway, Louisville 1, Ky. It is said to raise the temperature of 10 lb. of average material from 70 to 250° F. in 1 minute. Larger loads can be raised through the same temperature range in slightly longer heating cycles. The Thermex sliding tray handles preforms up to 6 by 23 by 26 inches. Use of the preheater cuts mold closing times, shortens production cycles, reduces the number of rejects, and brings about savings in per-piece costs. Air cooled and portable, the preheater unit occupies a floor area of 37 by 37 inches. The oscillator, preheater, and rectifier sections are contained in individual cabinets, rigidly mounted one upon the other.

Insulated infra-red lampless units—The Miskella Infra-red Co., E. 73rd and Grand Ave., Cleveland 4, Ohio, announces the addition of Spir-O-Therms, insulated lampless infra-red units which are interchangeable with the company's line of lamped and unlamped units. They can be used for baking, drying, heating, pre-heating, carbonizing, and dehydrating. Diagonal positioning of the elements eliminates hot spots and hot streaks existant in horizontal 90° lamp set-ups. Available in 2, 4, 8, and 12 lampless units, Spir-O-Therm elements consist of Pyrex tubes with spiral channel resistors and stainless steel contacts and reflectors. They are rated at 375 watts. Other reflectors, wattages are available.

Surface finishing machine—A high production machine for high quality surface finishing on sheets from ⅛ to ⅝ in. thick and up to 48 in. wide is announced by Johnson Engineering & Sales Co., 1139-F Broadway, Rockford, Ill. Known as the Johnson No. 3 flat work rubbing machine, it features a semi-automatic process for finishing plastic, composition materials, Masonite, wall board, wood panels, and stainless steel or brass sheets. Sanding pads which oscillate alternately at speeds up to 640 oscillations per min. are covered with rubber or woven felt. These pads back up abrasive paper supplied from roll stock, held in brackets at the side of the machine. Five adjustable rubber covered feed rolls assure flatness of the work as it passes beneath the sanding pads. The machine is equipped with flushing attachments for wet sanding. A tank in the base, with a ½ hp. motor driven pump, reclaims the water used for wet sanding. Provision is also made for dry sanding; suction tubes eliminate dry stock removal. The three oscillating shoes, each with 230 sq. in. of abrasive surface and 1-in. oscillation, are raised or lowered by means of worm and worm gear adjustments. They are operated from eccentric forms on the main drive shaft. Feed rolls range in speed from 5 to 30 ft. per minute. Over-all dimensions of the machine are 66¼ in. long, 55¾ in. wide, and 72 in. high.

Drill head—Specialty Equipment & Machinery Corp., 230 Park Ave., New York 17, N. Y., announces the Clocenter drill head which will drill any pattern of holes within a 3-in. diameter. It is made to fit on any drill press and is designed particularly for plastics, nonferrous metals, and other relatively soft materials. The size drill used determines the number of holes which can be drilled simultaneously; drills up to 3/16 in. can be used. Bent shank drills and a driver plate with an eccentric motion allows distance between holes to be as little as 1/32 inch.

Thermosealers—Three types of thermosealers for quick and reliable sealing of cellophane, cellulose acetate, heat sealing paper, and similar materials are being marketed by Wells Manufacturing Co., 220 Ninth St., San Francisco, Calif. Style TF features an adjustable thermostat that holds the temperature of the aluminum base within the close tolerance required for the given heat-sealing material. A label plate may be attached to this thermo-sealer to speed the application of labels and assure neat package. As the plate touches the label only, wrinkling is avoided.

A non-automatic thermosealer weighing 7 oz. is available in two styles: T-2, a slow sealing unit and T-5, a fast sealing unit. Broad seals may be made by using the flat bottom of the unit; narrow seals by using the edge.

The third type thermosealer features a sealing roller with a knurled or smooth edge. A built-in thermostat controlls roller temperature.

Control unit—For accurate die temperature control as applied to injection molding, Paterson Industries, Inc., 180-190 Putnam St., Paterson 4, N. J., announces the Pico Normalator. This unit, which can raise or lower the temperature of the die, features a self-contained system for recirculation of the heat transfer medium.

Deaerator—For deaerating plastisols, Cornell Machine Co., 101 Park Ave., New York 17, N. Y., offers the Versator. Thoroughly production tested, this deaerator is said to be suitable for plastisols having a wide range of viscosities. In addition, for certain formulations, excellent resin dispersion has been achieved simultaneously without milling.

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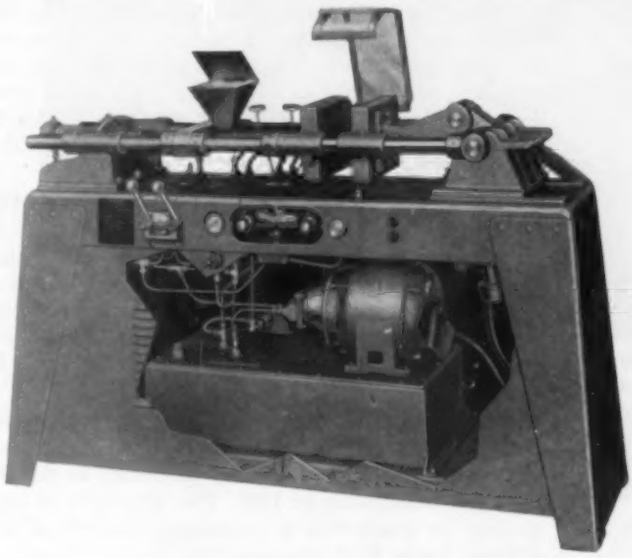
Unequalled in the 1 oz. class for molding thermoplastics including nylon. Moderately priced, this versatile press operates 8 hours for under one dollar. It uses less expensive molds, and can be set up by one man in 20 minutes.



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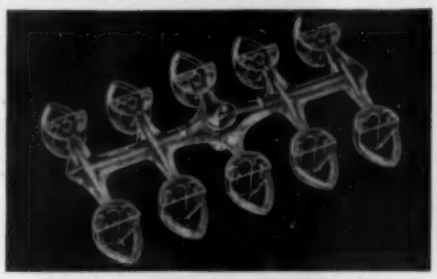

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Cellulose Acetate, ¾ oz., 5″ x 5″

Nylon, 1 oz., 8″ x 3″

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BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery

"The Chemistry of High Polymers," by C. E. H. Bawn.

Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. Price $4.50. 249 pages.

Recommended for students entering the field of high polymer research and for those working in this field who desire to know more about the fundamental aspects of the subject, this book is based on postgraduate lectures. Extensive use is made of pictorial aids in dealing with the theory and practical problems involved in addition and condensation polymerization, the thermodynamic behavior of high polymer solutions, and the determination of molecular weights, distribution of sizes, and shapes. The final chapter considers the relationship between molecular structure and physical properties. Ample literature references are provided.

"Silicones and Other Organic Silicon Compounds," by Howard W. Post.

Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Price $5.00. 230 pages.

The literature relating to silicone resins and other organosilicon compounds is cited and critically evaluated by the author. Important features of the book are a summary of Kipping's work, a survey of the technical and patent literature pertaining to the preparation of organic compounds of silicon, and a 30-page tabulation of the physical properties of silicon derivatives. A particularly interesting chapter reviews the industrial uses of the silicon compounds. The bibliography contains 707 references.

A rat tale—Protekwood, a low cost rat-repellent board, used for protection against rain, snow, wind, sun, fungus, and moisture is described in this brochure. *United States Plywood Corp., 55 W. 44th St., New York 18, N. Y.*

Tap drill sizes—This 13 by 19 in. wall chart covers American National Screw Thread Pitches as established by the National Screw Thread Commission authorized by Congress and subsequently approved for general use. Sizes of threads, threads per inch, outside diameter of screw, tap drill sizes, and decimal equivalent of drill are given for National Coarse Standard Threads, National Fine Standard Threads, and Special Threads. The charts may be obtained for 10¢ each from *South Bend Lathe Works, 418 E. Madison St., South Bend 22, Ind.*

Zerolite insulation—Essential data on sizes, temperature limits, conductivity, strength, water absorption, and combustibility are presented in this four-page folder on the company's new resin bonded mineral wool insulation for low temperature service. Also included are suggested uses for the insulation, which comes in the form of sheets, lagging, and pipe insulation. *Johns-Manville, 22 E. 40th St., New York 16, N. Y.*

Houghton serves the plastic industry—Designed to help establish correct lubrication practices for molding presses, this booklet describes in detail the Hydro-Drive hydraulic oils, gum solvents for cleaning hydraulic systems, Hydrolubric for conditioning closed water systems, and other lubricants and metal working products that the company produces. Information is given on the best lubricants, the methods of applying the lubricant, the period of serviceability, and the capacity of various molding machines. *E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.*

Plaskon molded color—Included in this four-color, 12-page booklet covering the company's urea and melamine molding compounds are data on the history of the compounds, their nature, color, surface and finish, strength, electrical properties, resistance to water, oils, solvents, etc., and moldability. Tables give physical properties and electrical properties. *Plaskon Div., Libby-Owens-Ford Glass Co., 2112 Sylvan Ave., Toledo 6, Ohio.*

Refractory castables, plastics, and mortars (Bulletin R-22)—Contained in this bulletin are data on the company's refractory plastics, what they are, and when they should be used. An outline of the properties of these high temperature plastics shows why they are especially suitable for severe furnace conditions. *Adv. Div., Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.*

Plastic aircraft tooling and tooling for transparent and optical plastics (8 targets)—This 222-page report gives the results of eight studies of processes in use by German manufacturers in 1945. The objective of each visit during the study was to investigate individual company efforts. Each visit covered five major phases: plastic lenses; heated aircraft windows; metallic vapor coating process; optical inspection units; and the fluid forming of sheet metal parts. The results are presented here. *Field Information Agency, Technical (U. S.) USFET (Main), Industrial Branch, APO 757, New York, N. Y.*

Technical data on extrusion of thermoplastics—Beginning with a general introduction describing the extrusion process, this 41-page booklet describes the types of equipment used in extruding, the operation of the dies, the thermoplastic materials used, and specifications of the National Rubber Machinery Company's extruders. *Omni Products Corp., 460 Fourth Ave., New York 16, N. Y.*

Upholstering with Firestone Velon Flex—The features of Velon Flex, the advantages of the material to the upholsterer, and the techniques of making patterns, cutting, stitching, tacking, and nailing are described in this two-color, four-page brochure. *Firestone Plastics Co., Pottstown, Pa.*

Catalog of Scotch and industrial pressure-sensitive tapes and their uses—It is stated that this 23-page catalog lists every type and variety of pressure-sensitive tape. All competitive tapes are grouped together. Some of the tapes included in the booklet are transparent, colored, metallic, paper, waterproof, plastic, electrical, high and

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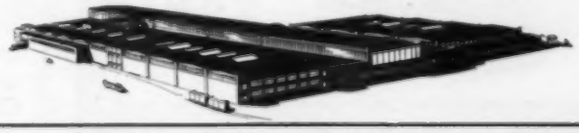

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low temperature, and double-faced tapes. Uses and applications are given for each tape. In addition, information is presented on dispensers for cellophane tape, definite length dispensers, specialty dispensers, and dispensers for paper tapes. *Robert Spector Co., 22 Park Place, New York 7, N. Y.*

Package in plastics—This 23-page booklet describes packages molded of Lustrex, Resinox, and Vuepack. The theme of the booklet is that plastic packages "sight-sell" by being re-usable, attractive, damage resistant, and suitable for window and counter display. Included are illustrations of plastic packages that have been successful on the market. *Plastics Div., Monsanto Chemical Co., Springfield 2, Mass.*

The handling of webs and monofilaments—Primary considerations of handling operations involving flexible and continuous strand or web materials such as wire, monofilaments, cords, tapes, tubings, paper, textiles, and films are put forth in this liberally illustrated booklet. The purpose of the study is to show the similarity of handling problems encountered in extrusion takeup of wire or cable, for example, as compared with the coating of textiles with plastic for electrical insulation or for decorative coating of fabrics or papers. *Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, Ohio.*

Thiokol liquid polymers in phenol-formaldehyde resins—The company's liquid polymers, which are co-reacted with phenol-formaldehyde resins to make them flexible, are described in this seven-page booklet. Pertinent information on the preparation of modified resins is given, as well as a list of commercial resins that the liquid polymers will modify. Information is given on the properties of such modified resins. *Thiokol Corp., 780 N. Clinton Ave., Trenton, N. J.*

Dielectric heaters—The story of high frequency dielectric heating is told in this 12-page booklet, which sets forth nine operating advantages for this process. Among the applications described are forming and drying insulation collars, thermoplastic sealing, heating plastic preforms, twist setting of rayon tire cord, and processing plywood panels. Specifications and dimensions of the company's dielectric heaters are given along with a description of such auxiliary equipment as electronic sealers and R-F voltmeters. Heaters are available in sizes from 100 watts to 125 kilowatts. *Allis-Chalmers Mfg. Co., S. 70th St., Milwaukee, Wis.*

Palestic—A low cost resin bonded gypsum, Palestic has been found practical for the production of many industrial, novelty, art, and household items. This four-page booklet describes the ingredients, uses for the material, molds to be used, preparation of the mixture, handling, and material cost. *Palestic Corp., 316 No. Laflin St., Chicago 7, Ill.*

Notation on a color system—The Cheskin Color System, which puts color selection and identification on a scientific basis, is described in this 20-page booklet. The color system, formulated on 4800 colors based on three primary pigments, involves 48 charts. The booklet describes the color system, how to designate a color, the chemical aspects of color, physiological aspects of color, and the psychological aspects of color. The Cheskin Color System may be obtained for $75 and the booklet for 50¢ by writing to the *Color Research Institute of America, 176 West Adams St., Chicago 3, Ill.*

New TIMKEN® "Double-Zero" bearing has run-out reduced by half!

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ONE industry after another is setting new standards of accuracy by equipping precision machinery with the new Timken® "Double-Zero" bearings. Maximum run-out tolerance—standard of bearing accuracy—is only 75 millionths of an inch in the "Double-Zero" bearing—half that of the Timken "Zero" bearing which had long been the most accurate Timken bearing on the market.

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PLASTICS STOCK MOLDS*

JULY 1949

Molders are invited to submit samples of stock products to be described on this page as space permits. Address samples and detailed information to Stocks Molds Editor, Modern Plastics, 122 E. 42nd St., New York 17, N. Y.

A—Traveling hanger opens up to make double rods for stockings, gloves, lingerie, etc. Made of polystyrene, hangers are available in red, yellow, blue, and green. Hanger is 8 in. long, 2½ in. tall; 18 cavities in mold. Maxwell Plastics Mfg. Co., 120 W. 42nd St., New York, N. Y.

B—Dainty plastic party basket. Comes in pink, blue, yellow, white, green, red and seasonal colors for holiday occasions. Handle has slit for ribbons and is interchangeable with different colored baskets. The baskets are washable and sanitary and may be used repeatedly or given away as souvenirs. Injection molded of polystyrene; 1½ in. wide at base, 3 in. wide at top and 1½ in. tall without handle. Best Plastics Corp., 6014 Eleventh Ave., Brooklyn 19, N. Y.

*Reg. U. S. Patent Office.

C—Handle for school bags and light cases. Replaces leather handles and is made of high impact phenolic, in 10-cavity mold. Leather-like colors of black, brown, and red. Weighs 1 oz. and is 3¾ in. long and 2 in. high. Kwik-Mold Plastic Corp., 247 W. 67th St., New York 23, N. Y.

D—Dip or ball point desk pen. Comes in white, black, pink, blue and other colors with acetate handle and butyrate pen section. Molds for both the handle and the pen section have 12 cavities each. These pens may be purchased, but molds are also for sale or rent. Di Carlo Crystal Etcher Co., Westwood, N. J.

E—Drain cleaner. Removes hair and foreign matter from wash bowls, also removes lint from drain in bath and laundry tubs. Made in red, white, and crystal clear polystyrene. Wires are stainless steel, spring tempered, claimed not to rust. 6¾ in. long and ¼ wide. Olson Tool Co., 2909 Quentin Ave., Minneapolis 16, Minn.

Don't let your market crack . . . plasticize your vinyl upholstery films with PARAPLEX G-50

You can't blame a customer for losing her temper when vinyl upholstery turns brittle, cracks and splits, when it discolors or becomes tacky. Blame your plasticizers for volatilizing from the vinyl compound . . . for failing under exposure to heat and sunlight . . . for migrating from the compound . . . *for costing you business.*

You'll have no disgruntled customers when you use PARAPLEX G-50 to plasticize your vinyl compounds. PARAPLEX G-50 does not migrate, has extremely low volatility. It resists heat and ultraviolet light, resists extraction by water and oil, by cleaning fluids and perspiration, by the wiping action that constantly assails furniture. In supported or unsupported vinyl upholstery, in vinyl footwear, electrical insulation, thin film, or hose, PARAPLEX G-50 provides a softness and flexibility that's there to stay.

You'll save money, too, for PARAPLEX G-50 now costs less than most monomerics. It's the polymeric plasticizer (with all the permanence and customer satisfaction that the term implies) at a monomeric price!

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Washing Machine Parts

LOW production costs, light weight, durability, and non-corrosive properties of Fiberglas-reinforced laminate explain why this material has replaced metal in four washing machine parts manufactured by the Apex Electrical Mfg. Co., Cleveland, Ohio. Three of these parts—a water balance ring, water deflector, and suds guard—are being molded by Apex for a washing machine sold under another trade name. The fourth part, a clothes guard, is used by Apex in its Wash-a-Matic machine.

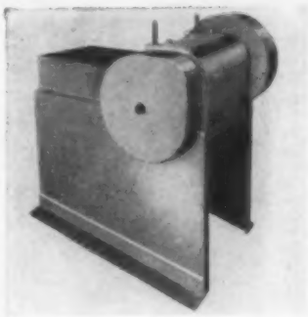
The most intricate of these is the water balance ring which itself is a sub-assembly of 41 laminate parts. These include a tapered cylinder, a shorter cylinder which is placed inside the tapered one, a ring cemented in place at the larger end of the tapered cylinder, and baffle strips which separate the two cylinders and are cemented to the inner surface of the shorter cylinder. As the water balance ring in the completed machine rotates, water splashes into it and is thrown against the inside wall, building a wall of water by centrifugal force. This wall forms on the side opposite the "out of balance" clothes, and is kept there until the load again is in balance, after which the water falls out the bottom.

To form these parts, glass fibers are blown onto a "preform" screen where a liquid binder is sprayed over them. After baking at 300° F., the preform is placed in a heated steel mold and thermosetting resin added. It is then subjected to a pressure of 45 tons for several minutes and removed.

Below: Light-weight, glass fiber-reinforced thermosetting laminate washing machine parts which are described above

Cumberland Machines for the Plastics Industry

New!



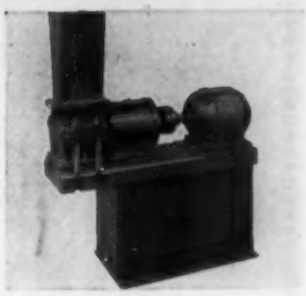
CUMBERLAND ROTARY CHOPPING MACHINE

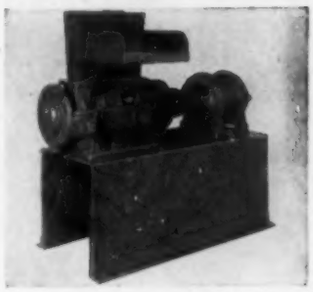
This machine cuts slab material from compounding mills, chops continuously extruded rods, sheets or stands, and cuts up calender roll side shear strips. This machine is also used in conjunction with extrusion machines to produce cube or pellet material suitable for a molding compound.

CUMBERLAND SLITTING & MANGLING MACHINE

This machine is useful primarily to manufacturers who compound plastic materials. The machine may be used to reduce material for use as a commercial product without further granulating. Or it may be used to prepare material for subsequent final reduction in a granulating machine.

CUMBERLAND PLASTICS GRANULATING MACHINES





These machines are designed especially for plastics. They perform with high efficiency the special cutting requirements of plastic materials. They are simple in design, rugged in construction and are easy to dismantle and clean. These machines are built in two styles. Nos. 0, ½ and 1½ as at top right (No. ½ is illustrated). Also, large 18" machine, double hung, with retractable knife block for complete accessibility. (Illustrated at right below.)

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Plastics Granulating Machines .....No. 200
Slitting and Mangling Machine .....No. 300
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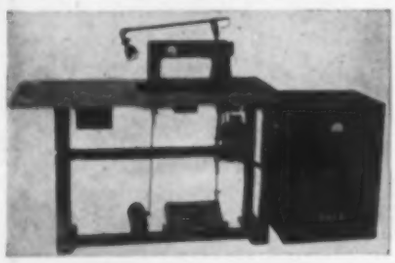

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Back of container is removed for inserting napkins. They, in turn, are easily dispensed through the decorative front

Napkin Holders

Two polystyrene napkin dispensers, both available in a variety of colors, have recently been marketed. One, a 7-in. sq. unit which can be hung on a wall or used flat on the table, is produced by Styson Art Products Co., New York, N.Y. The other, in a teapot design, is molded in one piece of Lustrex by Rogers Plastic Corp., North Wilbraham, Mass.

One-piece unit stands 5 in. high and 7 in. long. Avoidance of cemented joints is said to cut down on breakage

...Feeding time rings IN CUSTOM-MOLDED PLASTIC

Newest thing on the nursery front is this disposable feeding kit with "bottles" of tough, polyethylene plastic film. Locking rings for both nipples and protective plastic film cover, shown in the foreground, are custom-molded by General Industries for the Shellmar Products Corporation, Mt. Vernon, Ohio.

While not of intricate shape, these *feeding time rings* require exceptionally close tolerances in order to provide a strong, air-tight seal on the bottle. At General Industries, where close tolerances always are welcomed, both rings are produced in large quantities through the use of multiple cavity molds and the latest types of molding equipment . . . illustrating, again, the way in which the facilities of a leading custom molder can be adapted to meet any requirement . . . efficiently . . . economically . . . quickly.

Whatever the nature of your present or anticipated products in molded plastic, it will pay you to submit your blueprints to General Industries for quotations based on a confidential *Cost-check* analysis of your design. General Industries' capable engineers have effectively reduced unit molding costs for many of America's leading manufacturers . . . *they can do the same for you.*

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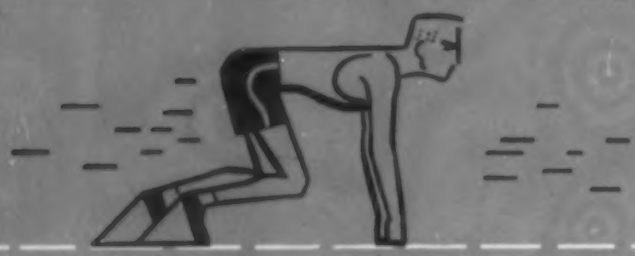
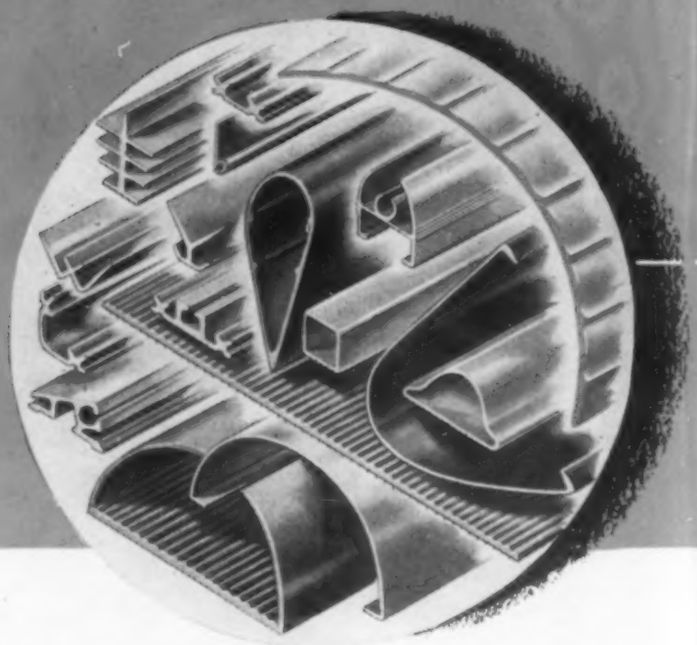
Plastic Process





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Is it . . . a TWELVE-INCH SECTION or MONOFILAMENTS ?

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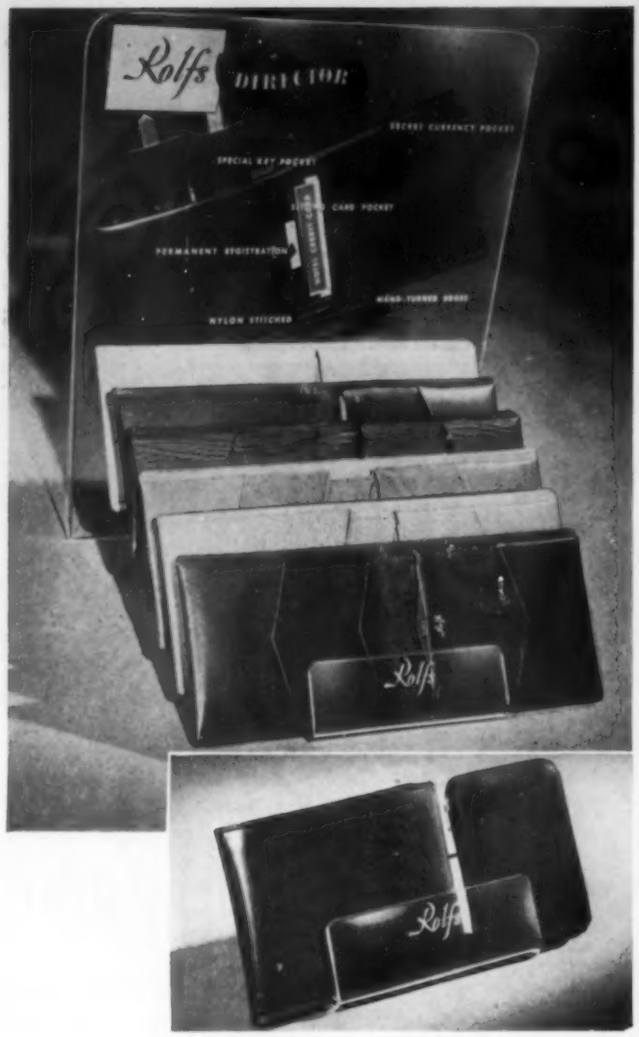

Handsomeness of wallets and key cases is enhanced by use of acrylic display units which come in a variety of sizes

Versatile Display Units

LEATHER goods of Rolfs, Div. of Amity Leather Products Co., West Bend, Wis., are shown to advantage at point-of-sale by means of new transparent acrylic display units.

These units, called Transplastic Merchandisers, are fabricated of Plexiglas by Balkan-Paull Co., Chicago, Ill., in several styles. They may be used separately or in combination on top of a counter, in shadow box displays, on the back counter, to present an elevated tier with selling copy for store windows, or to combine casual display within the show case and pre-sell silently at the same time.

One style holds six men or women's billfolds in front with a seventh attached to the back of the unit. Lettering on the acrylic back points up the features of the billfolds. A second style accommodates a dozen key cases. A third consists of an easel which can be used to complement and balance any arrangement. It is recommended for tie-in sales.

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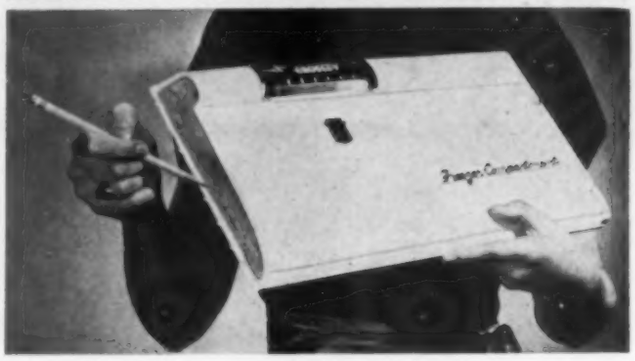

Top: Polystyrene freezer compartment door serves as shelf when open. Lower: Cut-away section shows insulating filler

Freezer Compartment Door

AN insulated polystyrene self-closing inner door, which also forms a handy rearranging shelf when open, closes the frozen food storage compartment on the deluxe and master models of the 1949 Shelvador refrigerators manufactured by the Crosley Div., Avco Mfg. Corp., Cincinnati, Ohio. The compartment itself measures 1½ cu. ft.—enough for 50 lb. of frozen food and four ice cube trays.

Dimensions of the freezer compartment doors on the 9 cu. ft. refrigerators are 22 9/16 by 8⅜ by ⅞ inches. Two polystyrene parts consisting of a front section weighing 17 oz. and a back section weighing 12 oz. are used in each door. Compartment doors for the 11 cu. ft. refrigerators are 1 in. longer and about 1½ oz. heavier. Cambridge Molded Plastics Co., Cambridge, Ohio, and Plastics Div., Standard Products Co., Detroit, Mich., are the molders.

Designed to keep heat from seeping through or around the sides or edges, the door is a "sandwich" with Fiberglas as the insulating filler between the front and back sections. The chrome handle is held by screws from the back; Speed Nuts hold the chrome medallion and script lettering in place.

All models feature recessed door shelves which provide easy access to bottles, fruits, eggs, dairy products, etc. Interchangeable transparent polystyrene vegetable and meat drawers are standard on all but the deluxe models. These have a special built-in moist-cold compartment.

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View of west bay—section of heavy machining department

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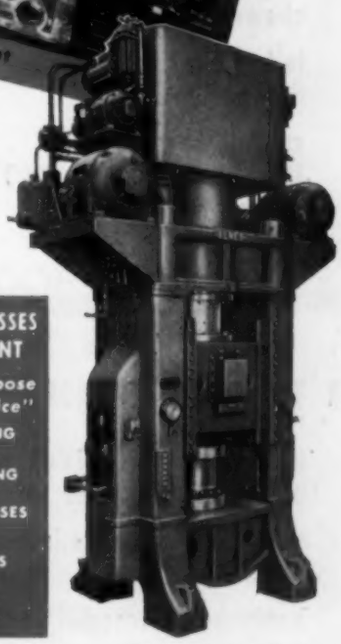
That move is now complete. All of our facilities—engineering, manufacturing, sales and management—are now located at Cincinnati, Ohio, in the great new plant pictured here.

This plant is one of the largest and finest in the industry. Its equipment is of the very latest type, unsurpassed for precision accuracy and high productivity. This superior machinery and extensive facilities of our new plant are enabling us right now to achieve production economies even beyond our own high expectations.

Visit us in our new home! We cordially invite you to see for yourself why ELMES is now in position to produce the very finest of Hydraulic Press Equipment on a basis of *economy plus.*



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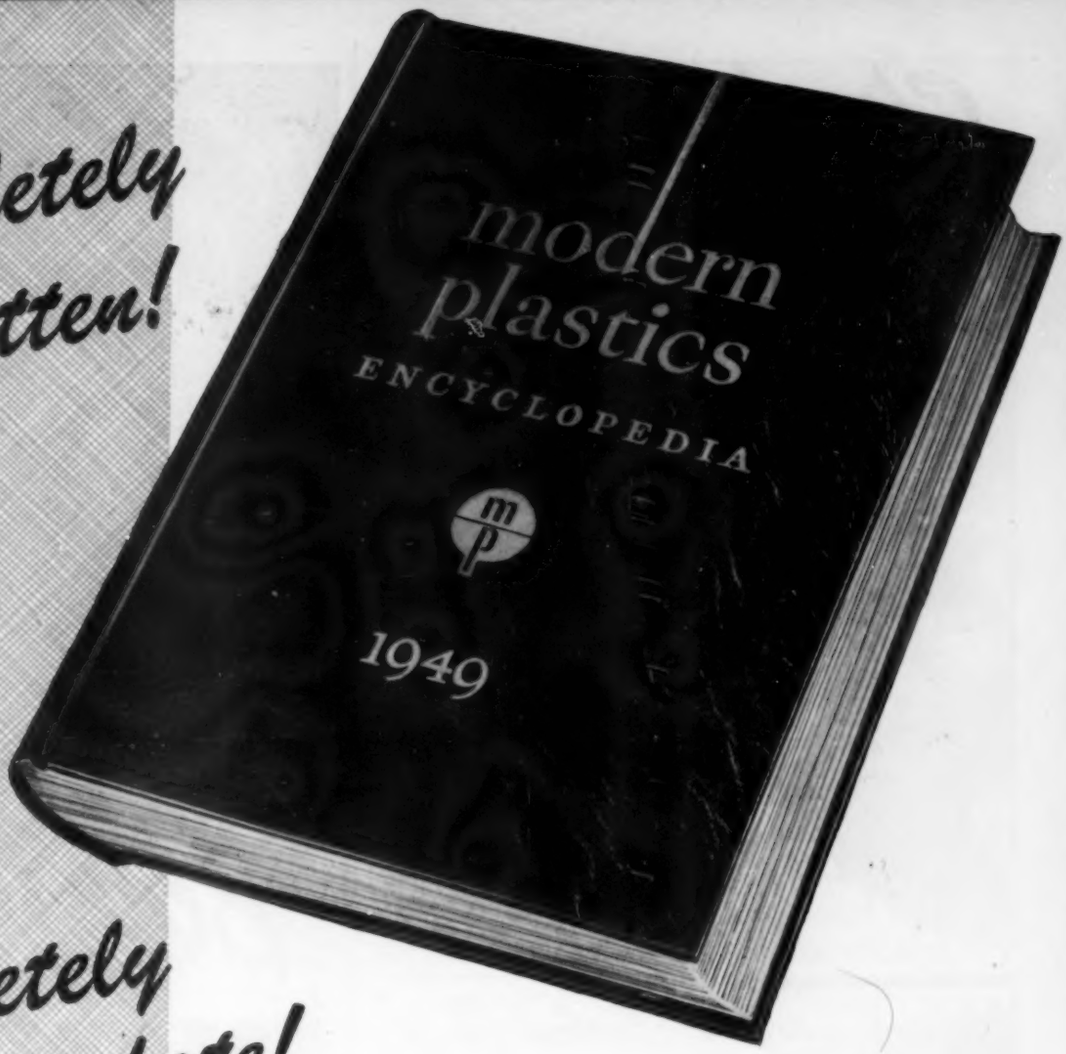

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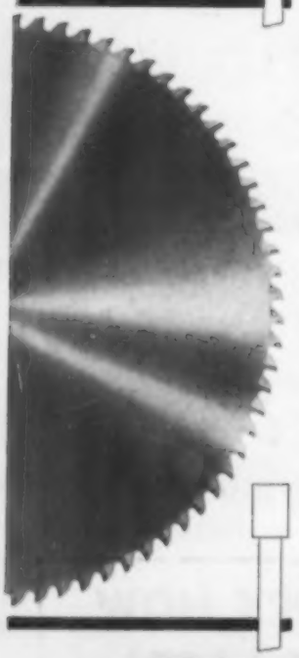

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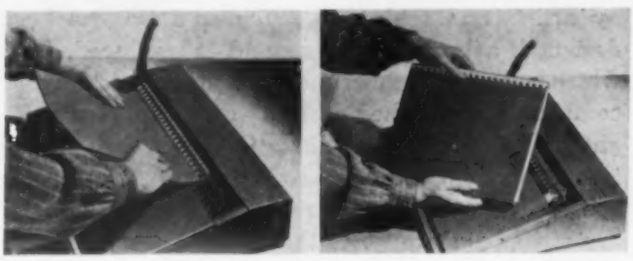
At left, holes are punched in sheets and covers. At right, vinyl ring strip is clipped into binding machine and opened



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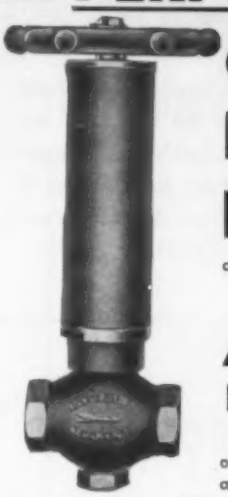

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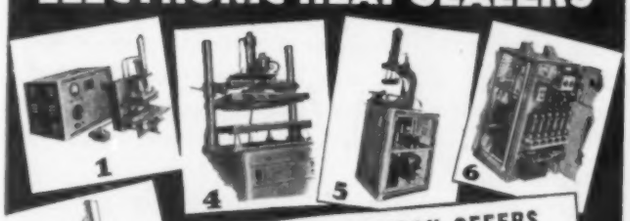

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Molded Nylon

The article "Molded Nylon," pages 57-63, June 1949 issue, should have carried the byline of Dr. Russell B. Akin, assistant to the eastern sales manager, Plastics Dept., E. I. du Pont de Nemours & Co., Inc. We regret exceedingly that this well merited credit was unintentionally omitted.

Effect of Temperatures

(*Continued from page* 104)

1. Every colorant so far tested shows an optimum heat and light stability when it is compounded with a particular stabilizer. Figure 1 shows three test panels containing colorant 1. Sections containing stabilizer E and lubricant-stabilizer G show a better combination of heat and light stability than sections containing the other stabilizers.

2. Even though colorants are of the same class, each may require a particular stabilizer for optimum light stability. Figure 2 shows two sets of three small test panels. The set on the left contains colorant 2, while the set on the right contains colorant 3. These colorants are both Indian reds. Colorant 2 exhibits much better light stability with stabilizer C than with stabilizer B. Colorant 3 exhibits better light stability with stabilizer B than with stabilizer C. Because these test panels were relatively opaque, it was necessary to photograph them with reflected light. The opacity of these panels is due to the colorant under test; no filler was incorporated.

3. Improper choice of stabilizers can result in plastics which have heat stability characteristics inferior to those of plastics containing no stabilizer. Thus, certain stabilizers reduce the heat stability of certain colorants so rapidly that the color is bleached during molding. Figure 3 shows three test panels containing colorant 6. Sections containing stabilizers K and L changed from a purplish-red to a light yellow in the 3-min. molding cycle. In the black-and-white print these sections appear almost white. In the 3-min. molding cycle all the other sections, including section A, remained red.

4. All stabilizers and lubricants so far tested produce variations in the hue, value, and chroma of a color, as well as in the opacity of the plastic in which they are incorporated. The degree and direction of these variations depends upon the particular stabilizer or lubricant but the variations are not in themselves objectionable if the final color of the

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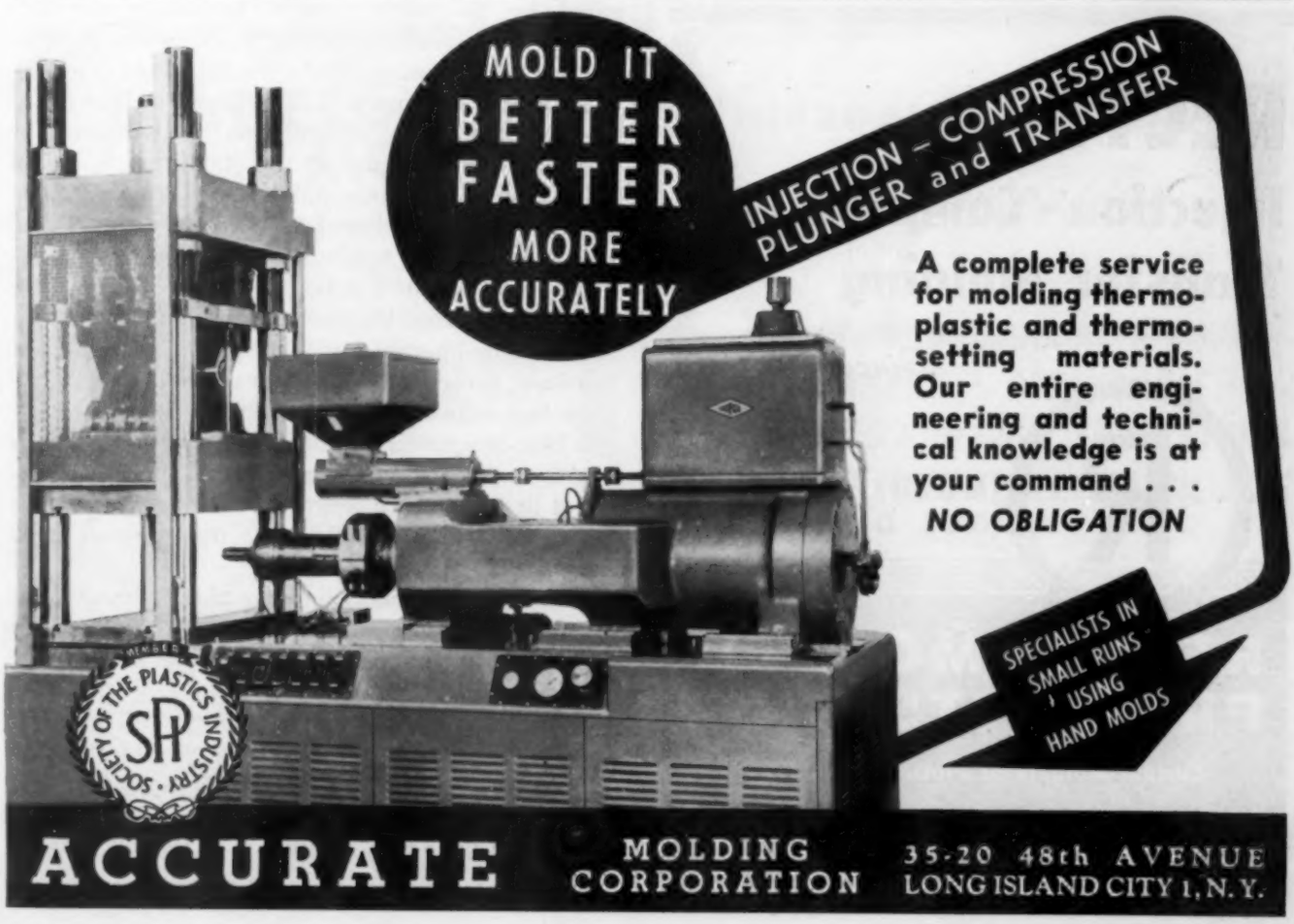

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finished plastic is stable to light and heat. Figure 4 shows three test panels containing colorant 5. In this plate the color of section A tended to bleach even in the 3-min. molding and, therefore, this section is not considered a control and is of minor importance. Other sections varied in hue from orange to red to purple. Of course, the black and white photograph cannot show these differences in color. It does show, however, that stabilization to both light and heat has been accomplished in sections which were most opaque, i.e., those containing stabilizers D and M. Sections containing stabilizer D were deep purple in color while those containing stabilizer M were a dark dull red. Figure 4 also shows that stabilization to both light and heat has been accomplished in relatively transparent sections, i.e., the sections containing stabilizer B. These sections were a lighter red than sections containing stabilizer M.

5. Some stabilizers permit the incorporation of ferrocyanides, such as iron blue, which under other conditions would catalyze the decomposition of the resin.[6] Figure 5 shows three test panels containing colorant 4. Sections containing stabilizers K and L have poor heat stability but light stability in excess of 300 hours. Sections containing lubricant-stabilizer G have poor light stability but relatively good heat stability. Plastics containing colorant 4 can be made both heat and light stable by using a combination of stabilizers as shown by Fig. 6. This panel is composed of four crosswise sections which were prepared by the same general procedure as that described previously with the following exceptions: 1) the colorant concentration was increased from 0.3 to 1.0 part per 100 parts of resin because other work has shown this concentration to be optimum for evaluations of iron blue; 2) two stabilizers, K (light stabilizer) and G (heat stabilizer), were employed, each in a concentration of 1.8 parts per 100 parts of resin; and 3) test batches were milled at 335° F. (instead of at 260° F.) for 5 min., and also for 10, 25 and 45 minutes. Portions of the milled stock were molded side-by-side for 3 min. according to the standard procedure. The four crosswise sections show that colorant 4 is now stable even after extensive high-temperature milling. One half of the length of this same panel was exposed for 200 hr. to ultraviolet light. The two lengthwise sections show that colorant 4 is now stable also to light as well as to heat.

6. Certain lubricants improve the light and heat stability of specific colorants. Figure 7 shows three test panels containing colorant 7. In the 3-min. molded panel, sections containing no lubricant were considerably bleached and, on exposure to light, they were rendered almost colorless. Sections containing lubricants H and J show better retention of the original dark red color on exposure to light, and to the heat of the 3-min. molding, than do sections con-

[6]Both Gournay[4] and Clark[5] reported unpredictable effects with ferrocyanides without reference to particular stabilizers employed.

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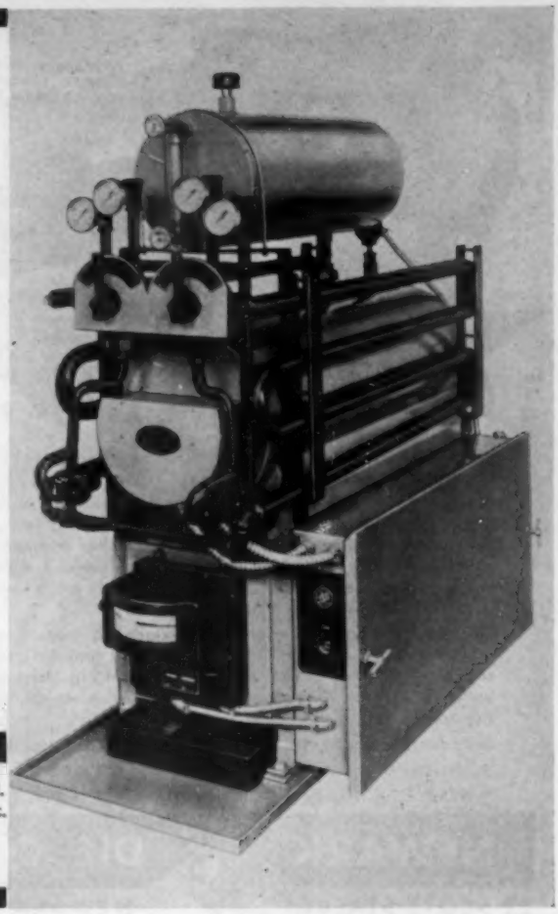

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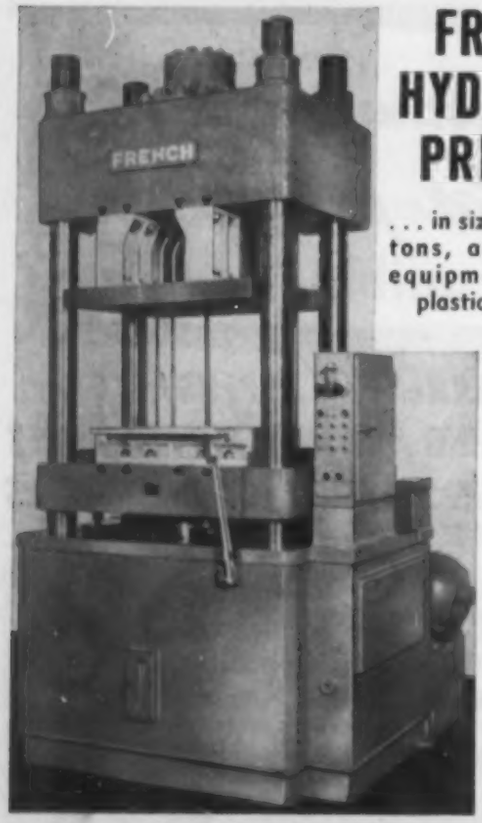

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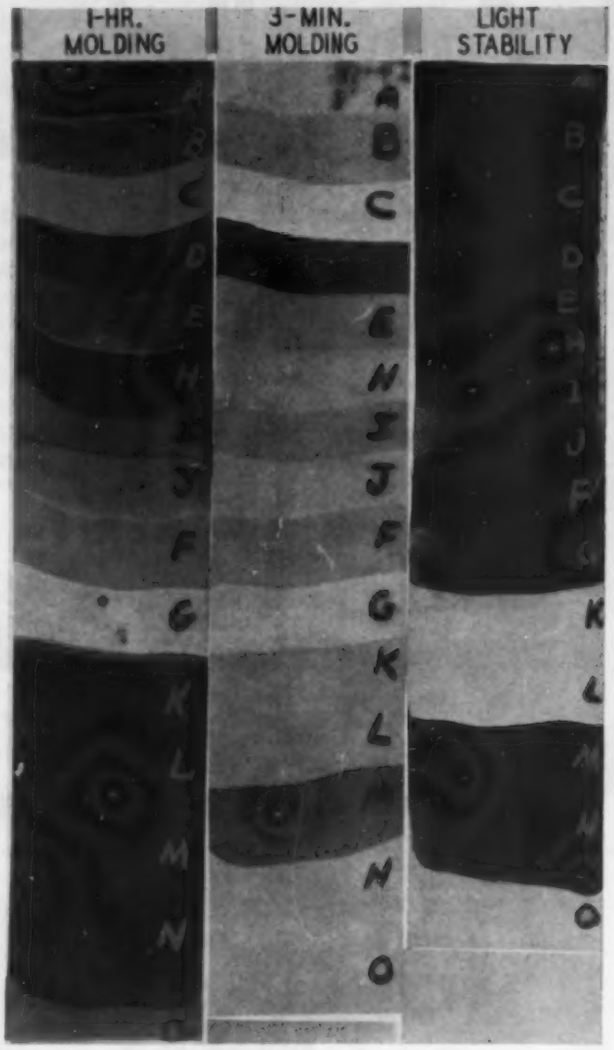
5—Effect of stabilizers and lubricants on the heat and light stability of colorant 4 (iron blue)



Key to Color Changes in Fig. 5, above

Sect. Label	1-hr. molding		3-min. molding		Light stability	
	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.
A	Extreme	10.0B2/2	Control	7.5PB2/8	Extreme	7.5BG2/2
B	Extreme	2.5PB2/4	Slight	7.5PB2/6	Extreme	7.5BG2/2
C	Appreciable	2.5B2/2	Appreciable	2.5B4/6	Extreme	7.7BG2/2
D	Appreciable	5.0PB3/6	Appreciable	5.0PB3/6	Extreme	10.0BG3/2
E	Slight	7.5PB2/2	None	7.5PB2/8	Extreme	10.0BG2/2
H	Extreme	2.5PB2/2	None	7.5PB2/8	Extreme	10.0BG2/2
I	Appreciable	7.5PB3/8	Appreciable	7.5PB2/8	Extreme	7.5BG2/2
J	Appreciable	2.5PB5/8	Slight	7.5PB2/8	Extreme	7.5BG2/2
F	Appreciable	5.0PB4/8	Appreciable	7.5PB2/6	Extreme	7.5BG1/2
G	Slight	5.0PB4/10	Slight	7.5PB2/8	Extreme	10.0BG1/2
K	Extreme	5.0B2/2	Slight	7.5PB2/6	Slight	7.5PB3/6
L	Extreme	7.5B2/2	Slight	7.5PB2/6	Slight	7.5PB3/6
M	Extreme	7.5B2/6	Slight	7.5PB3/4	Extreme	2.5BG2/2
N	Extreme	2.5B2/2	Slight	7.5PB2/6	Extreme	2.5PB2/2
O	Extreme	5.0PB2/4	Slight	7.5PB2/6	Slight	7.5PB2/6

taining no lubricant. Of course, for this same colorant, stabilizers or stabilizer-lubricants can be chosen which will give a better combination of heat and light stability than either of these lubricants. For example, in Fig. 7, sections containing lubricant-stabilizer F and stabilizers E and O are more heat and light stable than sections containing lubricants H and J. However, the beneficial effect of lubricants H and J for this colorant are also quite evident.

7. Several stabilizers and metallic soap lubricants reduce the tendency of certain colorants to bleed or

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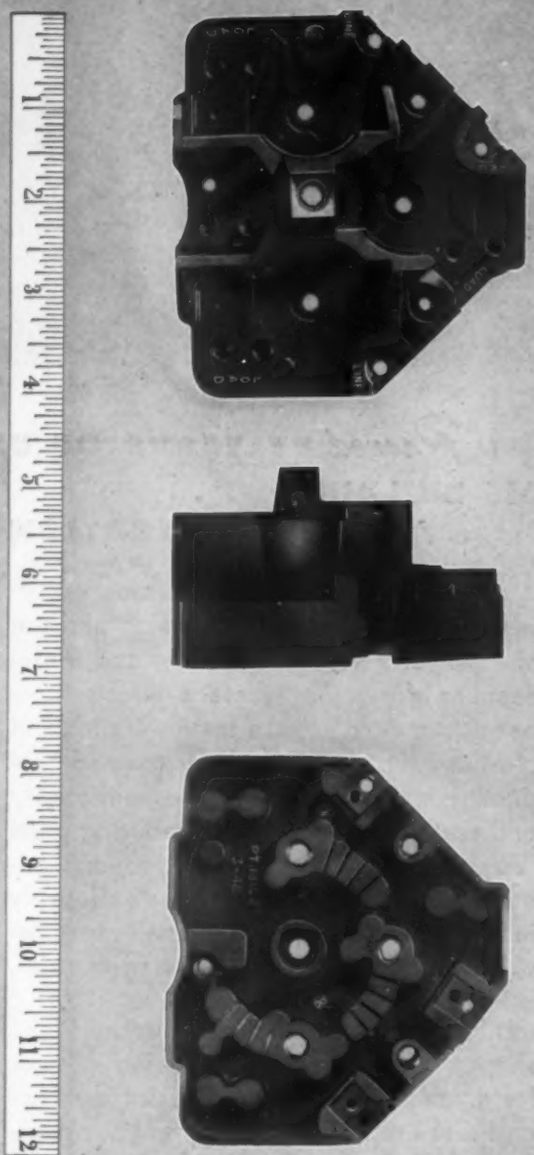

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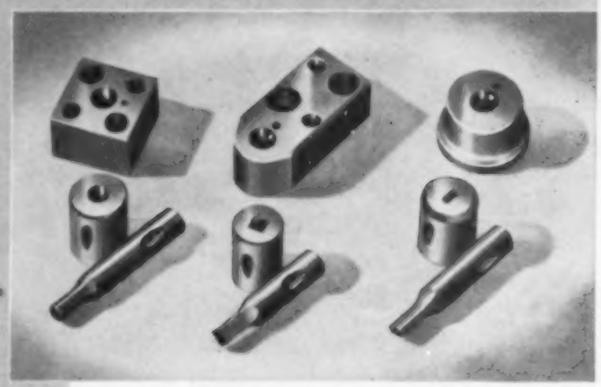

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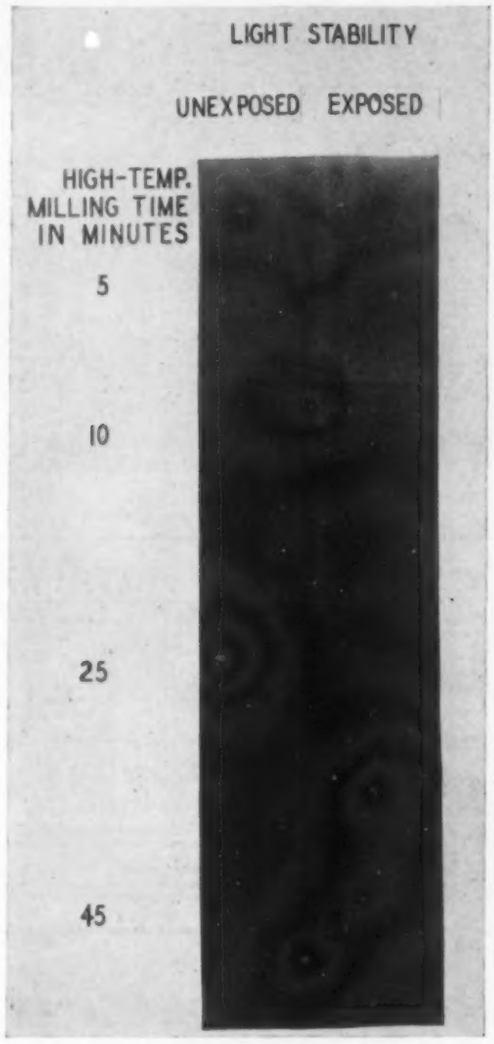
migrate. Figure 8 shows on the right a test panel containing colorant 5. On the left is the white Titanox-filled migration test strip against which the colored test panel was pressed. The migration test strip shows that sections of the panel which contain stabilizers B, C, D, and E, lubricant H, and lubricant-stabilizer F have markedly reduced migration tendencies compared with those of section A which contains no stabilizer or lubricant. Reduction of migration tendencies of colorant 5 with stabilizers B, C, D, and E is particularly evident.

Figure 9 shows on the right a test panel containing colorant 6. On the left is the white Titanox-filled migration test strip against which the colored test panel was pressed. The migration test strip shows

6—Effect of a combination of stabilizers on the heat and light stability of colorant 4 (iron blue)



Key to color changes in Fig. 6, above

High temperature milling time in min.	Light stability: Unexposed: ASTM D 620-45T	Light stability: Unexposed: Munsell Color No.	Light stability: Exposed: ASTM D 620-45T	Light stability: Exposed: Munsell Color No.
5	Reference color	7.5PB2/8	Slight	7.5PB3/8
10	Slight	7.5PB2/6	None	7.5PB3/6
25	Slight	7.5PB2/6	None	7.5PB3/6
45	Slight	7.5PB2/4	Slight	7.5PB2/6

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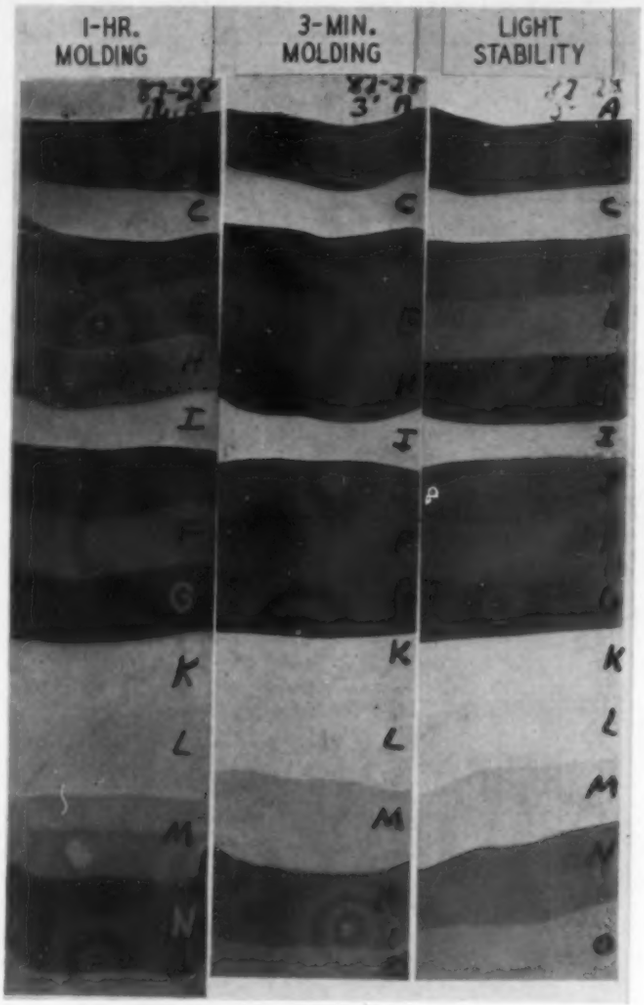
7—Effect of stabilizers and lubricants on the heat and light stability of colorant 7 (bon maroon)



Key to color changes in Fig. 7, above

Sect. Label	1-hr. molding: ASTM D 620-45T	1-hr. molding: Munsell Color No.	3-min. molding: ASTM D 620-45T a	3-min. molding: Munsell Color No.	Light stability: ASTM D 620-45T	Light stability: Munsell Color No.
A	Extreme	5.0R3/10		7.5R5/10	Extreme	7.5YR7/6
B	Extreme	7.5R3/10		5.0R5/12	Appreciable	5.0R4/12
C	Slight	7.5R4/12		7.5R4/12	Slight	7.5R5/12
D	Appreciable	5.0R3/12		5.0R5/12	Slight	5.0R6/12
E	Appreciable	7.5R4/12		5.0R5/12	Slight	5.0R6/12
H	Appreciable	5.0R3/6		5.0R4/14	Extreme	5.0R3/8
I	Slight	5.0R5/12		7.5R5/12	Appreciable	7.5R6/10
J	Extreme	7.5R4/6		5.0R5/12	Appreciable	5.0R4/12
F	Appreciable	5.0R4/12		7.5R4/14	Slight	5.0R4/10
G	Extreme	5.0R1/1		5.0R4/12	Extreme	5.0R3/8
K	Slight	5.0R4/12		7.5R4/14	Slight	7.5R5/12
L	Slight	5.0R4/12		7.5R4/14	Slight	7.5R5/12
M	Appreciable	7.5R4/8		5.0R5/12	Slight	7.5R6/10
N	Extreme	7.5R1/1		5.0R4/14	Slight	5.0R4/10
O	Slight	7.5R4/8		5.0R4/14	Slight	7.5R4/10

a Since the color of the control section A was considerably bleached in the 3-min. molding, it is not considered a valid control. For color changes according to ASTM D 620-45T, each section of the 3-min. molded panel is considered the reference color for the corresponding section in the other two panels. For example, the color of the 3-min. molded section containing stabilizer K is used as a reference color for comparison with the 1-hr. molding and the light-exposed section which also contain stabilizer K.

that sections of the test panel which contain stabilizers B, C, and N, and lubricant-stabilizer I have reduced migration tendencies compared with those of the control. Sections containing stabilizers B and C were noteworthy. Because test strips were opaque and panels translucent, Figs. 8 and 9 were made using both reflected and transmitted light.

8. Although no universal stabilizer has been found to exist, a combination of cadmium stearate and a

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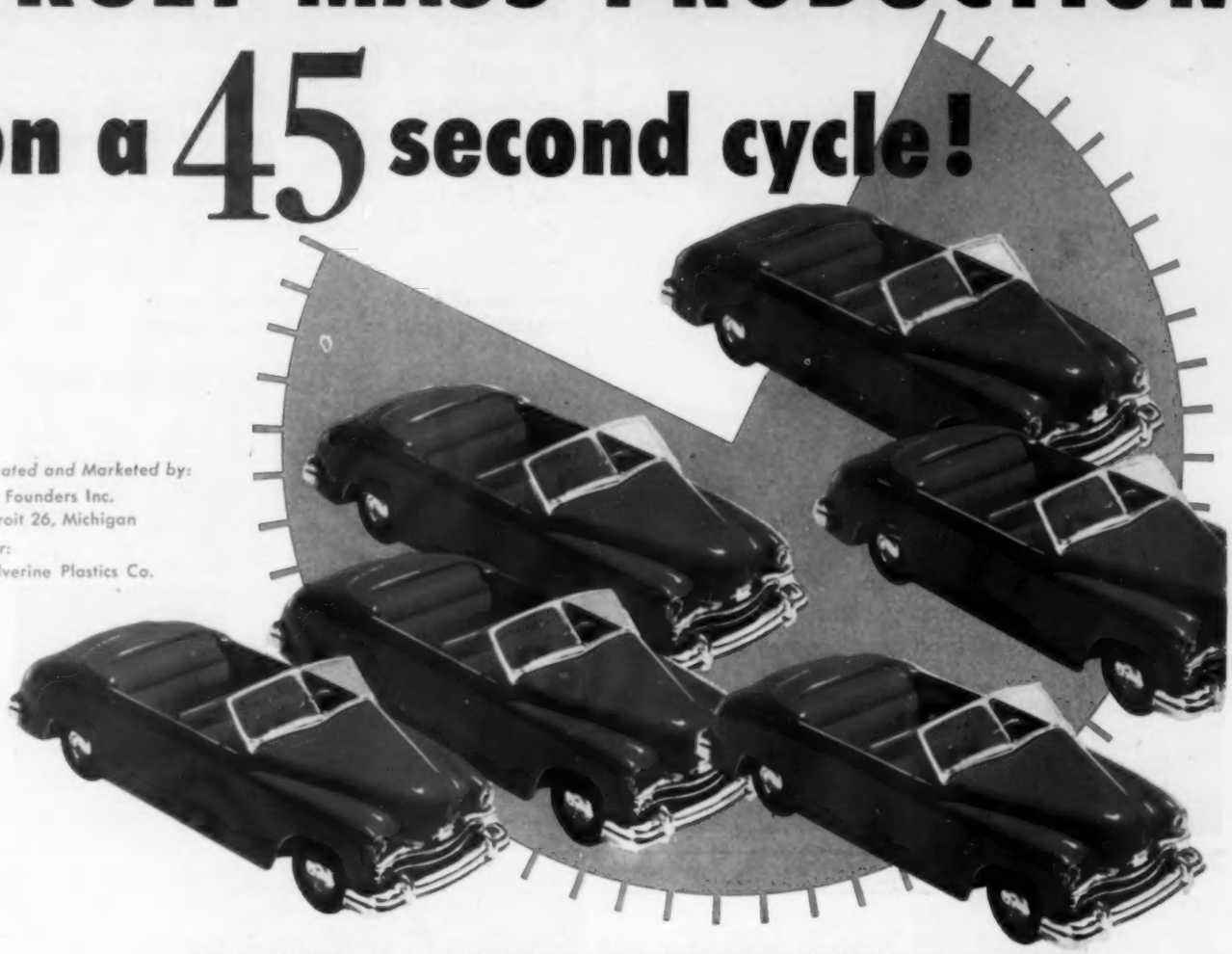

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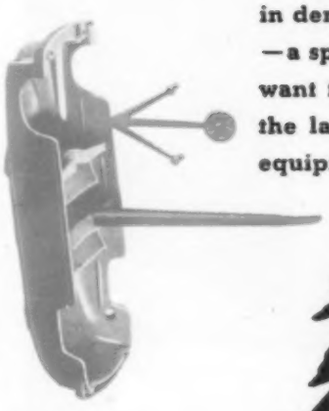

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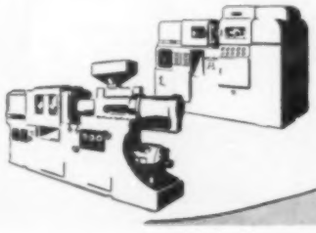

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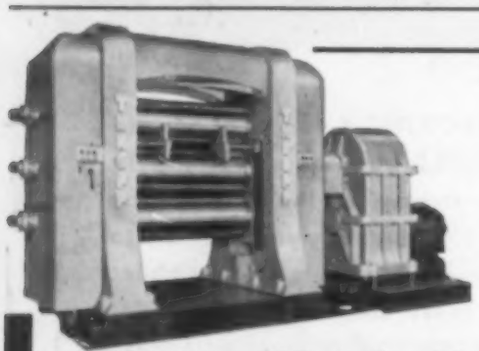

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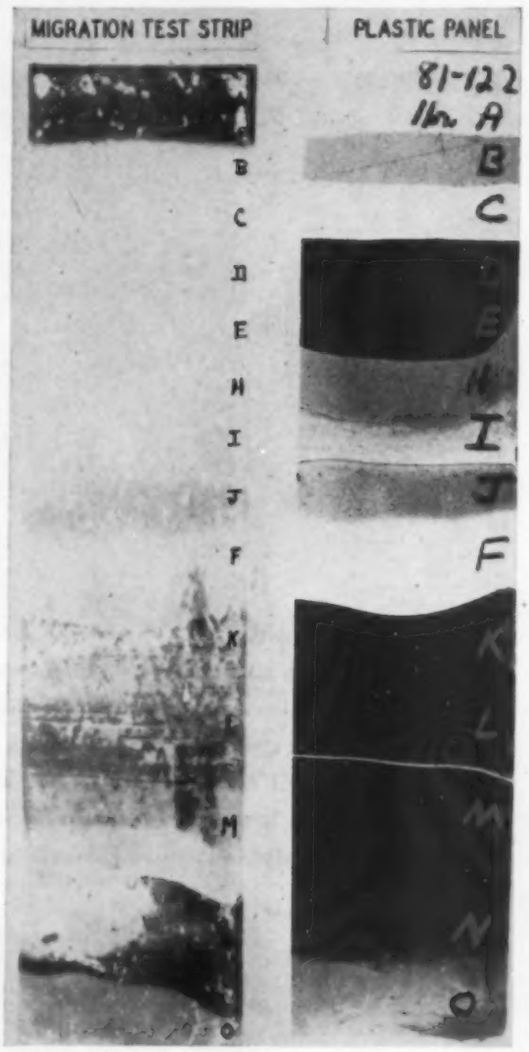
phosphate-type light stabilizer, designated as lubricant-stabilizer U, can be described as the best general-purpose material of any of those tested. Figure 10 shows four plastic panels. Each panel is composed of small, rectangular, test pieces containing lubricant-stabilizer U and a given colorant. These rectangular test pieces were prepared by the same general procedures as those described previously with the following exceptions: 1) the stabilizer concentration was increased from 1.8 to 3.0 parts per 100

8—Effect of stabilizers and lubricants on the migration of colorant 5 (Victoria maroon)



Key to color changes in Fig. 8, above

Section Label	Migration test strip a		Plastic panel b	
	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.
A	Extreme	5.0RP7/8	Extreme	2.5R3/10
B	None	N9.0+	Slight	2.5R3/8
C	None	N9.0+	Appreciable	5.0R3/12
D	None	N9.0+	Slight	5.0RP3/4
E	Slight	5.0RP8+/2-	Slight	2.5R2/8
H	Slight	5.0RP8+/2	Appreciable	2.5R3/12
I	Appreciable	7.5RS+/2	Appreciable	2.5R3/12
J	Appreciable	5.0RPS/2	Slight	2.5R3/10
F	Slight	5.0RPS+/2-	Appreciable	10.0RP4/12
K	Appreciable	5.0RPS/4	Extreme	2.5R3/6
L	Appreciable	5.0RPS/4	Extreme	2.5R3/6
M	Appreciable	5.0RPS+/4	Slight	5.0RP4/6
N	Extreme	5.0RP7/8	Extreme	5.0R2/2
O	Appreciable	5.0RPS/4	Slight	2.5R3/10

a The control color for the migration test strip of Fig. 8 is the white of the original strip as shown by its edges and by sections B, C and D where no migration was evident. *b* The plastic panel shown in Fig. 8 is the same as that shown on the left-hand side of Fig. 4. Hence, the control for the plastic panel of Fig. 8 appears in Fig. 4.

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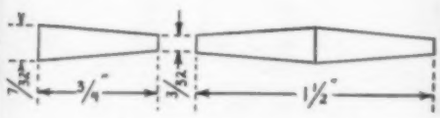

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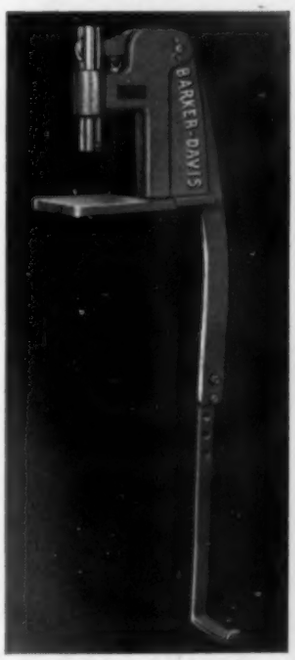

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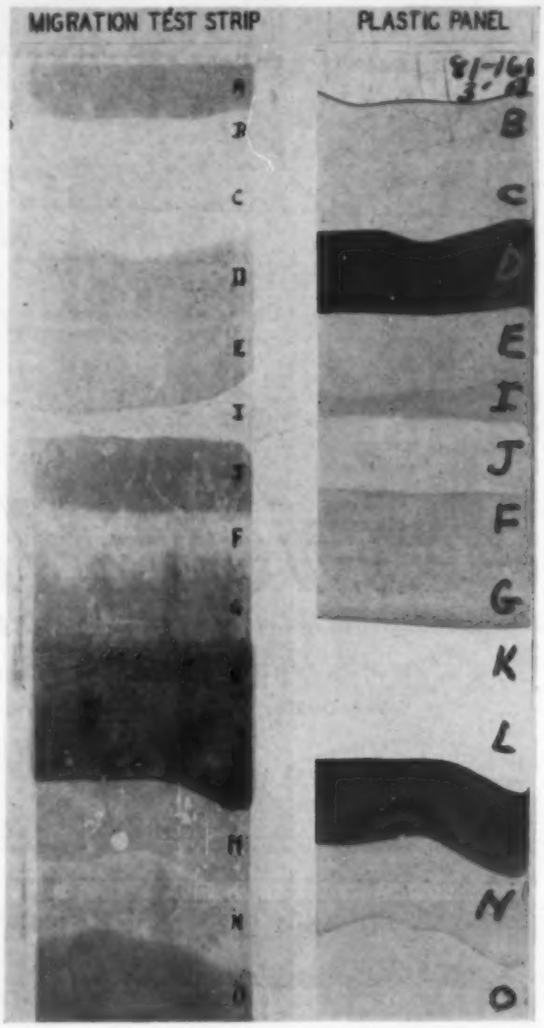
9—Effect of stabilizers and lubricants on the migration of colorant 6 (madder lake conc.)



Key to color changes in Fig. 9, above

Section Label	Migration test strip a		Plastic panel b	
	ASTM D 620-45T	Munsell Color No.	ASTM D 620-45T	Munsell Color No.
A	Extreme	10.0RP7/6	Control	5.0R4/12
B	None	N9/0 +	Appreciable	5.0R4/10
C	None	N9/0 +	Appreciable	5.0R4/10
D	Extreme	10.0RP7/6	Extreme	10.0RP5/6
E	Extreme	10.0RP7/6	Slight	5.0R4/12
I	Slight	10.0RP8 +/4	Slight	7.5R4/12
J	Extreme	10.0RP7/4	Slight	7.5R4/12
F	Slight	10.0RP8/4	Slight	5.0R4/12
G	Appreciable	10.0RP7/6	Slight	5.0R4/12
K	Extreme	10.0RP6/8	Extreme	2.5Y8/10
L	Extreme	10.0RP6/8	Extreme	2.5Y8/10
M	Appreciable	10.0RP8/4	Extreme	2.5R3/8
N	Slight	10.0RP8 +/4	Slight	5.0R4/12
O	Extreme	10.0RP7/6	Slight	5.0R4/12

a The control color for the migration test strip of Fig. 9 is the white of the original strip as shown by its edges and by sections B and C where no migration was evident.
b The plastic panel shown in Fig. 9 is the same as that shown in the center of Fig. 3.

parts of resin because other work had shown that 3.0 parts of lubricant-stabilizer U was an optimum amount for stabilization under the longer molding conditions employed; 2) individual moldings were made in a molding frame 6 by 6 by 0.075 in.; and 3) moldings were for 3-min., 60-min., 2-hr. and 3-hr. cycles. From these moldings, small rectangular pieces were cut and laid side by side for photographing. From left to right, the colorants employed in the individual pieces of each of these four panels are as follows: colorants 9, 10, 11, 12, 13, 14, 15, 4, 16

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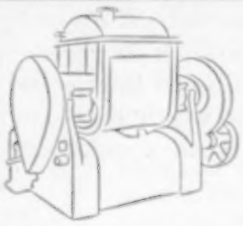

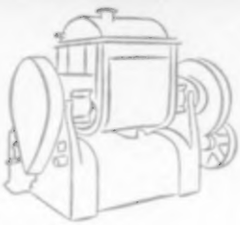

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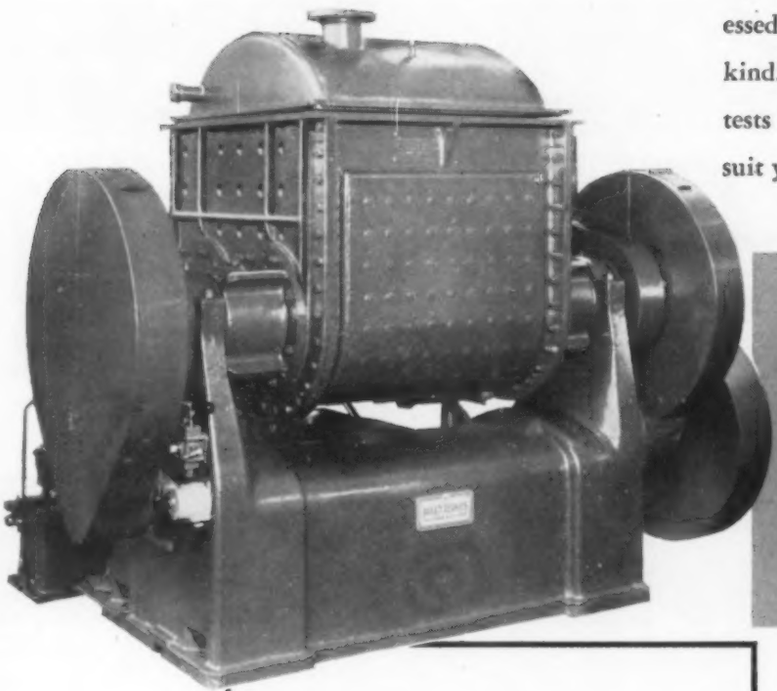

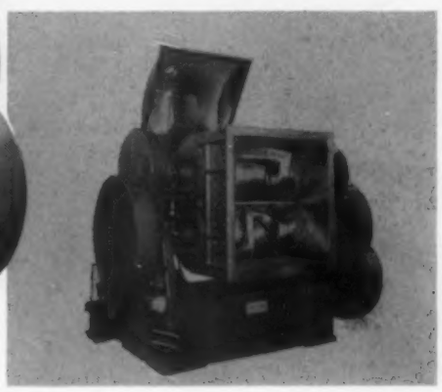

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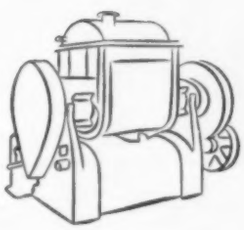


Illustrated: *A Size 16-JYIM2 B-P Universal Mixer, designed for vacuum operation, having 150 gallon working, and 265 gallons total capacity. Shell is jacketed for 125 psi steam pressure. Working surfaces are stainless steel. Shown in operating and tilt positions.*

and 17. These pieces show that all these colorants, when compounded with lubricant-stabilizer U, were heat stable even after a 2-hr. molding cycle. Because many of the test pieces were opaque at this thickness, Fig. 10 was photographed by reflected light.

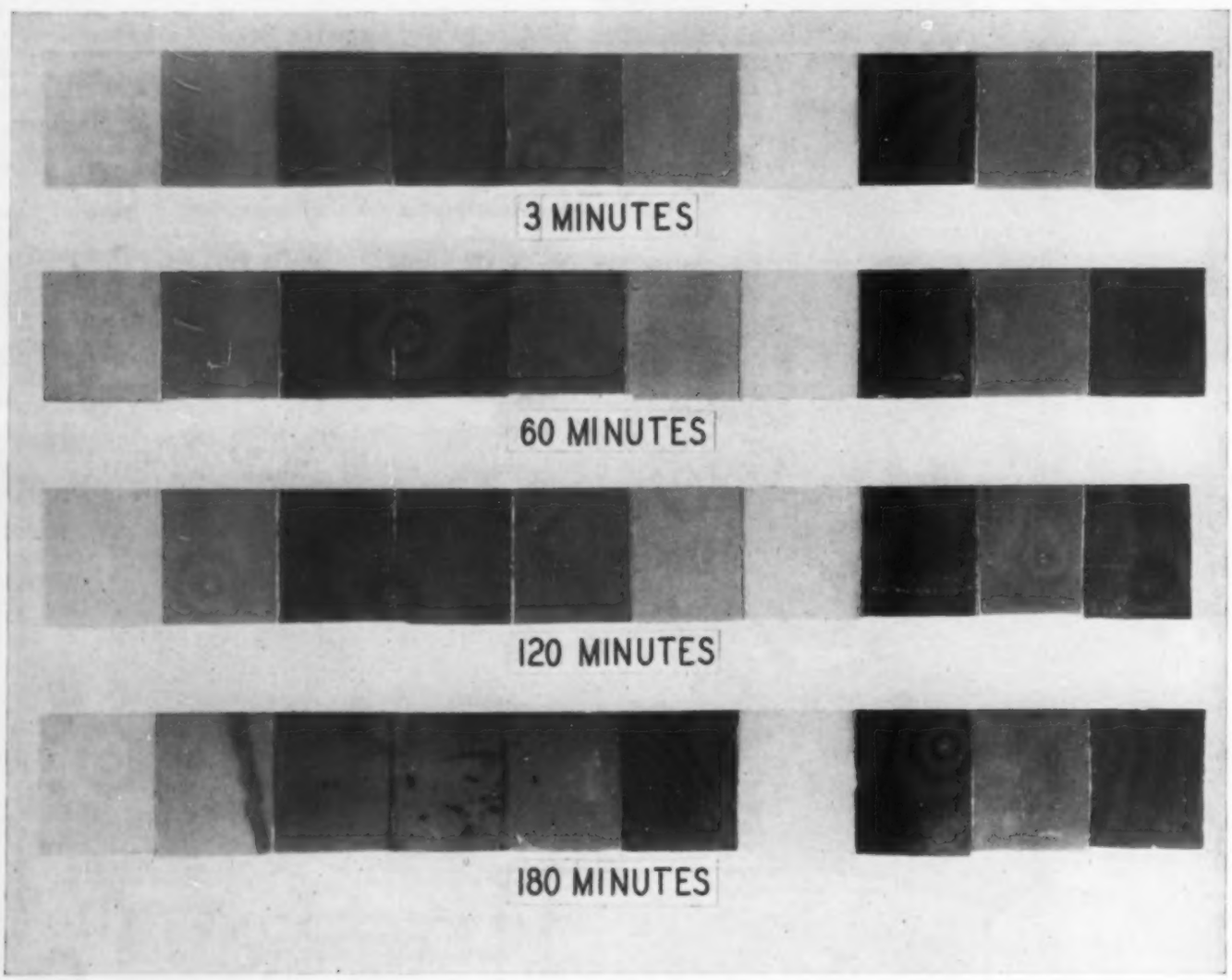
Conclusions

As a result of this work it has been concluded that, in the compounding of plasticized and colored polyvinyl chloride-type compounds, it is necessary to select a colorant with regard to its interaction with the stabilizer and lubricant which the compound contains. Also that, since each component of a particular formulation has been shown to affect the final color, statements as to the performance of a colorant can be made only for specific formulations.

Acknowledgement

Miss Eleanor F. Horsey, technical staff assistant to the manager of research and development, contributed materially in the organization and coordination of the data presented and in editing the manuscript. The author also wishes to acknowledge the assistance of Mr. Lee Dougherty, Photo Laboratory, The Glenn L. Martin Co., in the preparation of the photographs.

10—Effect of lubricant-stabilizer U on the heat stability of various colorants



Key to color changes in Fig. 10, above

				3 MIN. MOLDING						
ASTM D 620-45T	Reference color	Reference color	Reference color	Reference color	Reference color	Reference color	Reference color	Reference color	Reference color	Reference color
Munsell Color No.	7.5Y8/8	7.5R5/12	5.0R4/14	5.0R3/10	5.0R4/12	5.0R5/12	2.5Y8/12	7.5PB2/6	2.5G5/6	7.5G3/4
				60 MIN. MOLDING						
ASTM D 620-45T	None	None	None	None	None	None	None	None	None	None
Munsell Color No.	7.5Y8/8	7.5R5/12	5.0R4/14	5.0R3/10	5.0R4/12	5.0R5/12	2.5Y8/12	7.5PB2/6	2.5G5/6	7.5G3/4
				120 MIN. MOLDING						
ASTM D 620-45T	None	None	None	None	None	None	None	Slight	None	None
Munsell Color No.	7.5Y8/8	7.5R5/12	5.0R4/14	5.0R3/10	5.0R4/12	5.0R5/12	2.5Y8/12	7.5PB2/4	2.5G5/6	7.5G3/4
				180 MIN. MOLDING						
ASTM D 620-45T	Slight	Extreme	Appreciable	Extreme	Appreciable	Extreme	Appreciable	Slight	None	None
Munsell Color No.	7.5Y8/6	7.5R2/2	5.0R2/2	5.0R2/2–	5.0R4/10	N1.5	2.5Y8/8	7.5PB2/4	2.5G5/6	7.5G3/4

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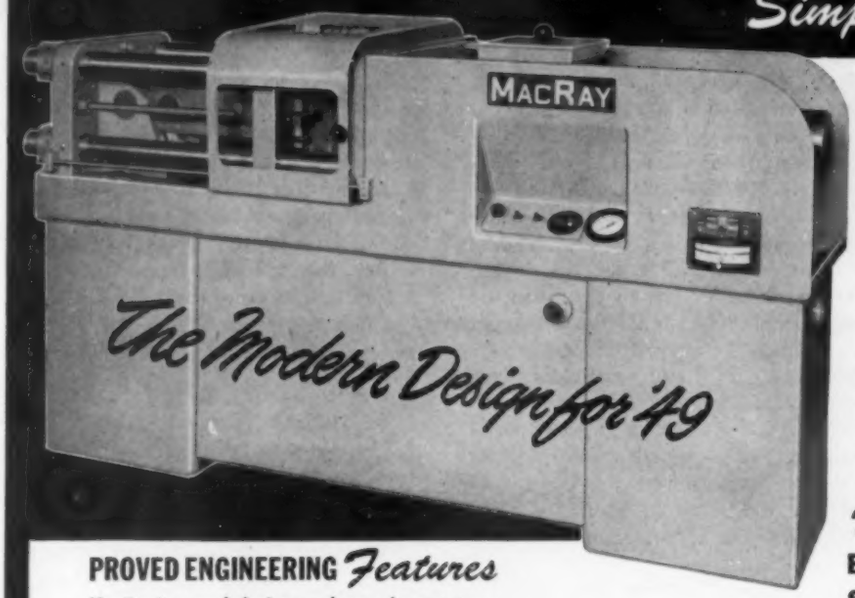

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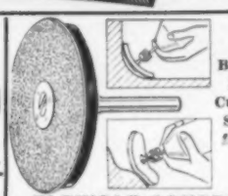

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INTERPRETATIONS OF THE CURRENT NEWS

By R. L. VAN BOSKIRK

Developments in floor coverings

INCREASED interest in plastic floor coverings was recently aroused by the announcement of two new materials; one by the Paulsboro Manufacturing Co., 17th and Sansom Sts., Philadelphia 3, Pa., called Sanduran, and the other called Sanitile by the Interchemical Corp., Empire State Bldg., New York 1, N. Y.

The basic material in Sanduran is described as a roll of specially fabricated cellulose sheet saturated with rubber latex and vinyl. After saturation, the material is passed through a high temperature oven where the three constituents are fused together. From the curing oven, the roll goes to a high speed photogravure press which handles 9-ft. wide material as fast as 500 ft. per min. to print Sanduran at a rate of more than 26,000 sq yd. per hour.

After printing, the material is coated with another application of vinyl and again cured. Following the final curing, the prepared sheet is bonded to an asphalt base similar to that used in linoleum. Company officials say the new flooring can be laid loose without fear of curling or bucking, or it may be cemented down like other hard surface floor coverings. It is available in 3 ft., 6 ft., and 9 ft. widths, thus allowing many rooms to be covered without seams; when seams are necessary, they will not open up through shrinkage, according to the producers.

The flooring looks and feels, and, in many respects, acts like rubber tile, yet will retail at less than ¼ the price of rubber. The printing on the cellulose-vinyl sheet can be done to represent wood grain, Wilton or Axminster rug designs, and other texture effects that are found in various types of flooring materials.

After the designs for the flooring are photographed, they are etched onto printing rolls. Hundreds of shades and tones of color can be obtained from a single roll; up to five rolls may be used in a single printing operation when color requirements demand.

Interchemical Corp.'s Sanitile was developed in cooperation with the Boston Woven Hose & Rubber Co., Boston, Mass., and the Chemicals Div. of Glenn L. Martin Co., Baltimore, Md. It is a three-layer sandwich consisting of a top coat of clear vinyl and a second or intermediate layer which provides the design and color. This design layer is composed of pigmented vinyl decorated in Interchemical's Buchanan, N. Y., plant. There are presently four patterns for this decorated layer: a wood grain pattern, a marble pattern, a multi-tone spatter pattern, and a "Bombay tile," which has the effect of a solid color beneath a texture.

The bottom layer of the sandwich is a vinyl-based compound, said to give foot comfort, recovery from heavy furniture markings, and resiliency. All three layers are joined together in "continuous-cure" vulcanizing equipment perfected by Boston Woven Hose. In this massive "Rotocure" welding press, the three layers converge, one above the other, beneath a huge slowly revolving drum. As the material proceeds through the press, high heat and tremendous pressure fuse it into one integrated whole. It emerges from the press with an embossed "tooth" on the underside to facilitate laying with a special Sanitile adhesive. It can be laid over wood, plywood, or most any other type of floor, including concrete which is in direct contact with the ground.

It is claimed that the welding operation eliminates the shrinkage problem. Sanitile flooring has undergone a year of field testing and will be priced comparably to other high quality resilient flooring.

Another comparatively new vinyl flooring is now being tried out on one of the floors in Macy's department store in New York. It consists of a vinyl sheet printed or treated to resemble broadloom. The vinyl is attached to a sponge rubber base and is intended to convey the appearance of a carpet. It is planned to sell another at from $6.00 to $7.00 a yd., which is comparable to good grade carpeting.

Still another interesting development of plastics in the floor covering field is the ever-increasing use of coumarone indene resin in so-called asphalt tile. Manufacturers do not give out information on the subject, but experts say that some of these tiles have more coumarone indene in them than they have asphalt. One of the great advantages is that the use of this resin permits use of bright colors.

Government contracts

FACTS about Government procurements, showing how manufacturers can obtain Government business, are now available in a new Procurement Brochure published by Trilane Associates-U. S. Government Procurement Service at its New York offices, 1 Hudson St., New York 13, N. Y. Free copies are available for the asking.

New electrical laminate

A SERIES of heavy-duty Fiberglas reinforced Glastic electrical insulating laminates having all the requirements of high-impact class B insulating plate materials, plus flame resistance, has been announced by Laminated Plastics, Inc., 14838 Euclid Ave., Cleveland 12, Ohio. The new materials possess a unique combination of high rigidity, impact strength, arc and flame resistance, heat resistance, and low moisture absorption, according to the manufacturer, and are said to have already found wide use in heavy-duty apparatus by several manufacturers of electrical power equipment. Glastic plate materials are available in standard thicknesses from 1/32 to 1½ in., and in standard sheets 36 by 48 inches.

Alcohol for plasticizers

TRIMETHYLHEXANOL, a long-chain primary alcohol, is now being produced for the first time on a commercial scale by the Ammonia Dept., of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. It has a boiling point of 190° C. and is not soluble in water.

Esterification is regarded as the most important commercial reaction of the new product because some of its esters appear definitely promising as plasticizers, synthetic lubricants, additives to lubricating oils to im-

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prove viscosity index, and for other applications. Many of these esters are effective plasticizers for such resins as polyvinyl chloride, polyvinyl acetals, and certain derivatives of cellulose, including ethylcellulose, cellulose acetobutyrate, and nitrocellulose.

Dibasic acid esters of this new alcohol have shown particular promise as plasticizers for resins of the polyvinyl chloride type. Certain trimethylhexyl esters are also particularly well adapted for use in vinyl resin plastisols that are spreadable at room temperature. Plastisols prepared with the phthalic and adipic esters of trimethylhexanol have exceptionally long working life.

Synthetic fiber research

FORMATION of a new company to engage in research and development work in the field of synthetic fibers by the Monsanto Chemical Co. and the American Viscose Corp. was recently announced. The organization, as yet unnamed, will be headed by Dr. Carroll A. Hochwalt, a Monsanto vice-president, and will pursue its research and development work through the laboratories of Monsanto and Viscose. Other officers of the company include Dr. Charles S. Venable, director of chemical research for American Viscose, who will be vice-president, and F. William Koster, of American Viscose, who will be secretary-treasurer.

Polyethylene film price cut

A GENERAL price reduction on its Reynolon 1000 Series polyethylene film has been announced by the Plastics Div., Reynolds Metals Co., 19 E. 47th St., New York 17, N. Y. The reduction amounts to as much as 21¢ a lb., depending upon the quantity ordered. The film is now available in 0.0015 to 0.005 in. gage in transparent only.

Thermoplastic glass mat

A NEW polystyrene or vinyl impregnated glass mat has been put on the market by the Standard Insulation Co. of East Rutherford, N. J. In continuous roll or sheet form, it has a potential use by low pressure laminators who can cut and lay it up in as many layers as is necessary to fit job requirements.

The manufacturer claims that this Fiberglas mat can be processed more conveniently than conventional laminates and that over-all production cost should average no more than with conventional thermosetting laminates. Drawing operation does not have to be done with reference to a cure cycle since the material is not thermosetting. The laminated sheets can be stored and then drawn whenever convenient. A large saving in material is also possible inasmuch as any scrap has possibilities of re-use as fill.

The impregnated Fiberglas can be furnished in a wide variety of colors.

Census Report for Plastics Materials

MANUFACTURERS in the plastics materials industry shipped products valued at $483.4 million (Table I) during 1947, according to preliminary figures released by the Bureau of the Census, Department of Commerce. This is an increase of 480% over the $83.3 million value of products reported by this industry in 1939, when the last Census of Manufactures was taken. Value added by manufacture in the industry during 1947 amounted to $200.3 million, an increase of about 400% over the $39.7 million value added in 1939. Value added by manufacture is calculated by subtracting cost of materials, supplies, containers, fuel, purchased electric energy, and contract work from the value of products.

Production worker employment in the industry averaged 22,212 (Table II) in 1947 as compared with 7191 in 1939. Wages paid to production workers increased 536% from

Table I.—General Statistics for the Plastics Materials Industry, United States Totals: 1947 and 1939. (Money figures and man-hours in millions)

Item	*1947*	*1939*
Number of establishments	125	41
All employees:		
Salaries and wages (total)	$93.4	[a]
Number (average for the year)	29,337	[a]
Production and related workers:		
Number (average for the year)	22,212	7,191
Man-hours (total)	47.1	[a]
Wages (total)	$64.3	$10.1
Value added by manufacture[b]	$200.3	$39.7
Cost of materials, fuel, electricity, and contract work	$283.1	$43.6
Value of shipments[c]	$483.4	$83.3
Expenditures for new plant and equipment	$50.7	$4.4

[a] Not available. [b] For 1947, value of shipments less cost of materials, fuel, electricity, and contract work. For 1939, value of production less cost of materials, fuel, electricity, and contract work. [c] Value of production for 1939.

Table II.—General Statistics for the Plastics Materials Industry, by State, 1947. (Money figures in millions)

Item	*United States total*	*New Jersey*	*New York*	*Pennsylvania*	*Massachusetts*	*All Other*
Number of establishments	125	32	21	11	10	51
All employees:						
Number (avg. for the year)	29,337	8,827	2,657	3,820	3,210	10,823
Salaries and wages (total)	$93.4	$28.1	$9.0	$12.9	$10.1	$33.3
Production and related workers:						
Number (avg. for the year)	22,212	6,957	1,857	2,761	2,291	8,346
Wages (total)	$64.3	$20.2	$5.6	$8.4	$6.6	$23.5
Value added by manufacture[a]	$200.3	$66.3	$23.8	$19.1	$18.4	$72.7
Cost of materials, fuel, electricity, and contract work	$283.1	$67.1	$18.7	$48.8	$34.0	$114.5
Value of shipments	$483.4	$133.4	$42.5	$67.9	$52.4	$187.2

[a] For 1947, value of shipments less cost of materials, fuel, electricity, and contract work.

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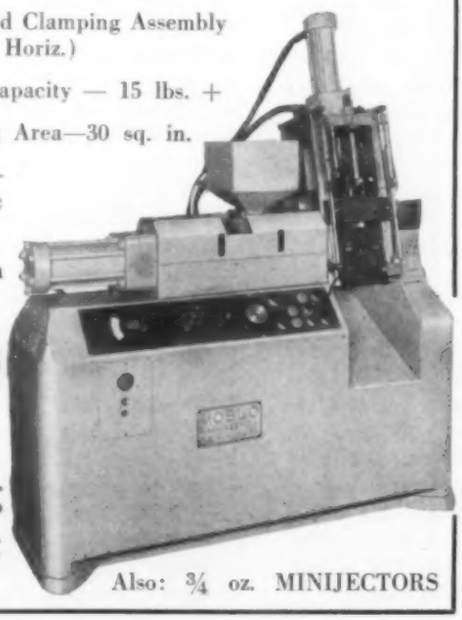

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$10.1 million in 1939 to $64.3 million in 1947. The industry's expenditures for new plant and equipment during 1947 totaled $50.7 million as compared with $4.4 million for 1939.

These statistics are derived from a preliminary tabulation of manufacturers' reports in the 1947 Census of Manufactures.

Pelletized vinyl compounds

PLASTICIZED polyvinyl chloride resin compounds in uniform cubical form, which field tests show offer users improved uniformity and better quality control of their products, have been announced by B. F. Goodrich Chemical Co. The new type plasticized compound can be used for extrusion, calendering, and molding.

In the wire and cable industry, the new cubical granules are expected to increase considerably the efficiency of the extrusion operation and the quality of vinyl insulation. More even and complete heating of Geon plastic is made possible during extrusion because of uniform cubical size. Porosity sometimes caused by the entrapped air in nonuniform granules is minimized.

The improved resins are the result of a new method of granulation recently developed by engineers of the company. They are offered for sale at no added cost.

Sample service

MANUFACTURERS whose products require plastic components may have sample parts made and tested by the Ace Plastic Co., 91-30 Van Wyck Blvd., Jamaica 1, N. Y., before placing final orders. The company offers comprehensive service on all fabricated plastic requirements and advises it will make up samples from the customer's prints on request, without obligation.

Polyethylene supply

THE shortage of polyethylene which plagued users for the first quarter of 1949 seems to be completely abated. It has been estimated that around 2,000,000 lb. a month of polyethylene was being consumed during the first three months of this year. There is now enough polyethylene available so that twice that much material could be consumed if there were enough demand for it, according to reliable estimators.

The two producers, Bakelite and Du Pont, have now both completed and are operating their second units, which double capacity. The two Bakelite units are at South Charleston, W. Va., and the Du Pont units are on the Sabine River near Orange, Texas.

Obviously, the time is ripe for all polyethylene processors to start thinking about ways and means to expand their marketing range.

Army rainwear

THE recommendation that the Quartermaster obtain from industry suitable quantities of rainwear materials for evaluation was approved at a recent meeting of industry representatives with the National Research Council's Committee on Plastics and Elastomers of the Advisory Board on Quartermaster Research and Development, to review the Army rainwear program.

The materials are to be obtained on the basis of a tentative specification or description which embodies the essential requirements known to exist for the particular item. The quality of the materials should be based on performance, and the formulation should not be limited to any class of compounds or fabrics.

Those interested in submitting samples for inclusion in the evaluation program are invited to write to Dr. Warren Stubblebine, chief of the Plastics and Chemicals Section, Research and Development Branch, Office of the Quartermaster General, Washington 25, D. C., for details.

High gloss phenolic

DEVELOPMENT of a phenolic molding powder with outstanding heat resistence and improved gloss and surface finish has been announced by Monsanto Chemical Co., Springfield, Mass. Catalogued as Resinox 10231 Black, the new product is said to meet demands of molders of utensil handles and knobs for a phenolic powder that withstands extremes of thermal shock and still retains a high gloss.

Products molded of the new material have withstood exposure to temperatures ranging from 400 to 500° F. for more than 100 hr., according to company officials; in another test, products were transferred immediately from room temperature to a hot oven without evidence of the blistering that usually results in tests of less resistant material. The new phenolic molding powder is also said to be less critical to mold and has established a fast cure cycle.

Motor-car glazing

GLAZING of motor vehicle windows with transparent plastics has received the approval of the Pennsylvania Bureau of Highway Safety, according to Rohm and Haas Co., Philadelphia, Pa., which has supplied technical data and test material to various states for investigation. A bulletin has been issued by the Pennsylvania Bureau which lists the location in motor vehicles where rigid and flexible plastics may be employed in window glazing.

The American Standards Association Committee has been working on the Safety Code for Glazing Materials for Automotive Vehicles and has nearly completed its recommendations for a revision of the code which will include the requirements and permissible use of plastics on automotive vehicles.

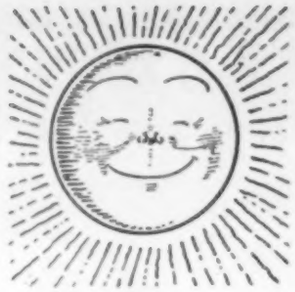
The States of New York, New Jersey, and Connecticut have also set up procedures for the approval of plastic glazing materials.

Educational opportunities

ADVANCED instruction in the use of specialized physical tools in chemistry is offered in the Sixth Annual Series of Summer Laboratory Courses given at the Polytechnic Institute of Brooklyn, N. Y., to industrial and institutional representatives who wish to learn specialized techniques in a condensed but thorough way.

Two courses on Molecular Weight Determination of Polymers, beginning June 27 through July 1, and Polymerization Techniques, July 25 through 29, offer advanced instruction in the up-to-date method of experimentation and evaluation of the results in the general field of fibers, rubber, and plastics. Extensive equipment in both X-ray and high polymer laboratories is at the disposal of the students.

Attendance at each course is limited, and full particulars may be obtained from I. Fankuchen, Pro-



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Two years ago, Polytechnic Institute inaugurated a Plastics Option in its Chemical Engineering Curriculum from which the first group of 10 students graduated in June. These boys have received excellent special training in the field of plastics technology in addition to their regular chemical engineering training.

Wire coating

SOMEWHERE near 40,000,000 lb. of vinyl resin were used for molding and extrusion in 1948. When plasticizer and filler were added, the total poundage was somewhere in the neighborhood of 65,000,000 pounds. Producers estimate that almost 90% of this material was used for coating wire and cable.

The extent to which vinyl has been taking over in the wire coating industry is seldom realized. As an example, it has been reported that approximately 200 ft. of wire are used in the average automobile. A spokesman for one of the largest automobile manufacturers is reported to have stated that all but 20 ft. of the wire used in his company's cars is now coated with vinyl. Another indication showing the widespread use of this material is a statement by a spokesman for one of the largest wire coating companies that 60% of all house wire extruded last year was covered with vinyl compound.

Plasticizer prices

THERE has been a mild juggling of dioctyl phthalate plasticizer prices over the last six weeks but, as we go to press, word comes that they have firmed at the following price schedule:

Tank car lots, 41¢; carload lots, 42½¢; less-than-carload lots, 43½¢. Former prices were, respectively, 43, 44½¢, and 45½ cents.

Urea resins for paper

SAID to be unique in its long-term stability and its adaptability to a wide range of paper products, Uformite 520 is a new resin being produced in commercial quantities for the paper industry. A urea-formaldehyde resin, it is one of the family of Uformite resins produced by the Resinous Products Div. of Rohm and Haas Co., Philadelphia, Pa., and is identical with the liquid Uformite 467 except that it is supplied in powder form. It is infinitely dilutible by water and therefore may be used in the same fashion as is 467; that is, it may be added at the wet end of the paper machine to confer wet strength on kraft wrapping paper, toweling, paper for potato bags, etc. Moreover, the resin improves dry strength, tear, mullen values, and other physical properties of paper.

The need for a wet strength resin in dry form is great in paper plants where wet strength runs are sporadic; Uformite 520, because it contains no water, is amazingly stable in prolonged storage between runs. Moreover, export problems like freezing of aqueous resins and the possible reactivity of aqueous resins in equatorial climates is eliminated when Uformite 520 is shipped.

This material should in no way be confused with Uformite 609, which is dimethylol urea used as a paper additive but is not interchangeable with wet strength resins. Dimethylol urea is a low-molecular-weight compound which, because of its small molecular size, can penetrate paper fibers more throughly than can the high-molecular-weight Uformites. D.M.U. modified paper, however, is no longer paper; that is, a towel treated with this urea compound would not be much of a towel. The Uformite resins, on the other hand, bring about pronounced improvements in the physical properties of paper — particularly wet strength — without changing the appearance, feel, color, etc. of the paper.

Electrical insulating panels

DEVELOPMENT of plastic wall panels from wood pulp was discussed by Dr. Robert M. Boehm, director of research, Masonite Corp., Laurel, Miss., at a recent monthly meeting of the Louisiana Engineering Society and the New Orleans Section of The Society of Plastics Engineers.

Highlight of Dr. Boehm's talk was the announcement of a new product known as Benelex 100, developed by the Masonite Corp. for use as electrical panels. This material was described as showing marked superiority over old type dielectric boards. Use of Benelex 100, it was stated, will make it possible to cut down on the size and weight of switchboards in industrial plants, surface vessels, submarines, and airplanes.

Plastic electrical tape

A PLASTIC backed electrical adhesive tape with a dielectric strength of over 10,000 volts has been announced by Bauer and Black. The tape has the insulation and electrical characteristics of its parent material, polyethylene, and is claimed to be 10 times more resistant to moisture than vinyl tapes. Called Polyken #822, it is recommended for use in place of splicing tapes or compounds covered with friction tape. Further information may be obtained by writing Polyken, Dept. F, 222 W. Adams St., Chicago.

Vinyl-nylon combinations

AN all-plastic vinyl reinforced with nylon woven fabric embedded in the film itself, has been developed by the Textileather Corp., Toledo, Ohio, especially for use as upholstery material for commercial transport vehicles. The material is manufactured by a very different process than conventional plastic leathercloth or unsupported plastic film, according to the developers, and is expected to replace hide leather for extra-heavy-duty upholstery applications, and at lower cost.

Laminate price drop

A GENERAL price reduction on all its major grades of Synthane (laminated phenolic) in sheet, rod, and tube form has been announced by The Synthane Corp., Oaks, Pa. On full-size sheets and full-length rods and tubes, the reduction will approximate 8 to 10 percent. Machined components and other products fabricated for industry in the Synthane plant will reflect the reduction in materials prices.

Press standardization

MACHINERY made from widely interchangeable, standard components and providing "Custom-tailored" efficiency at the cost of standard equipment is offered by The Denison Engineering Co.,

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The makers of Cortland's Fly Rod Line chose Northern to help design and engineer, and to mold this unique container which is used for transferring line to fishing reel, and for storing line after use. If you are casting about for the most complete molding service, remember — "*Plastics* are Right if they're Molded by *Northern*". Solid color cap and reel of Phenolic with a transparent cover of Polystyrene.

Fly line holder and reel

Cut-out view shows construction, note product visibility.

Showing parts detached.

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Write for Bulletin A60 describing Atrax Carbide Burs in detail.

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SIZE: 16 to 60 ligne in diameter

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THE PLASTISCOPE

Columbus, Ohio, in its Multipress line of oil-hydraulic equipment for operations on production runs and problem jobs requiring press capacities from 1 to 35 tons.

This line now provides a flexible range of complete self-contained presses to match any of a wide variety of industrial requirements, according to company information. The presses are available in seven standard sizes of compact, space-saving frames, each of which is designed for specific dimensional and tonnage requirements. Three groups of elements, interchangeable to a degree, make up the major operating components within the Multipress oil-hydraulic press frames and offer a choice of combinations for varying ram speed and control. These units include the hydraulic power assemblies, cylinder and ram assemblies of several sizes, and control valves of as many as 10 different types.

Standardization of oil-hydraulic presses as applied by this manufacturer is reported to be an effective step toward greater economies and improved output in press departments of many industries.

Phenolic price adjustments

A READJUSTMENT in prices affecting 51 Bakelite phenolic molding materials, which went into effect May 15, has been announced by Bakelite Corp. A price reduction of 5%, amounting to 1¢ per lb., affects two of the walnut mottled materials which are being used for production of television and radio cabinets.

Made-to-order colored materials are also included in the revised prices. Of these, 37 have been reduced 8%, amounting to an average of 2¢ per lb., while 12 others have been increased approximately 6% or an average of 1½¢ per pound.

Colored and mottled molding materials, as well as black and brown, can now be bought in bags at ½¢ per lb. below the drum price.

Cold molded business sold

SALE of General Electric Co.'s cold molded plastics business to the Garfield Manufacturing Co. of Garfield, N. J., has been announced by the G-E Chemical Dept. as a final phase in the closing of the department's Meriden, Conn., plastics plant. The transaction included inventories, formulations, engineering specifications, and some equipment from Meriden.

General Electric is discontinuing production of cold molded plastics in order to give more emphasis to the growth of its thermosetting and thermoplastic molded and laminated lines, according to the company announcement. The Garfield Co. has been producing cold molded plastics similar to the G-E line since 1908. It has begun the transfer of equipment and customers' molds from Meriden on a planned schedule arranged so as not to interfere with regular deliveries to G-E's former cold molded plastics accounts.

Standards for adhesives

AN invitation to those interested in adhesives to attend future meetings and participate in the work of Committee D-14 on Adhesives, American Society for Testing Materials, was extended by this group at a recent meeting. The development and approval of several tentative standard test methods has already been achieved. Tensile properties, peel or stripping strength, and applied weight per unit area are covered in standard methods. Resistance of adhesive bonds to chemical reagents is another standard, and the effect of light on permanence has been covered in a test. A series of definitions of terms has been standardized.

The next meeting of this committee is scheduled for early October, 1949, in Philadelphia, Pa. Information and details concerning the activities of A.S.T.M. Committee D-14 can be obtained from the A.S.T.M. Headquarters, 1916 Race St., Philadelphia.

COMPANY NEWS

American Insulator Co., New Freedom, Pa., pioneer in the plastics business since 1916, recently entertained representatives of the plastics and other industries on the occasion of the completion of its four-year modernization program. The modernized plant covers 100,000 sq. ft. of area and employs 550 people when in full capacity operation. Among the new pieces of equipment installed during the course of the modernization program were hot compression molding presses up to 2000 tons capacity and cold molding presses up to 200 tons capacity.

Nassau Chemicals, Inc., 420 Market St., San Francisco, Calif., has been formed to manufacture specialty chemicals and to serve as western distributors of plastics and chemicals for other organizations. Charles F. Hosford, Jr. is president; R. C. Whitman, vice-president and sales manager; Gordon R. Whitman, vice-president and plant manager; and A. J. Frederick, secretary and treasurer.

Mr. Hosford is a former chairman of the National Bituminous Coal Commission and president and general manager of Pennsylvania Coal Products Co. R. C. Whitman served with Monsanto Chemical Co. and later with Makalot Corp.

The Bolta Co., Lawrence, Mass., has created an Injection Custom Molding Div. as a direct result of the expansion of its injection molding facilities. The company has been manufacturing proprietary items for the past 18 years. Although announcement of the new division has just been made, Bolta is already custom injection molding for the refrigeration, drug, electronic, precision instrument, and electrical industries.

H. G. Salzman, Inc., 1150 Broadway, New York 1, N. Y., has been appointed New York representative for the Burroughs Co. in Los Angeles, Calif., manufacturers of Burrite plastic kitchenware items.

Boland Manufacturing Co. of Winona, Minn., has announced a new custom-styled vinyl raincoat to be manufactured from Goodyear's vinyl film. Boland now operates three plants in Minnesota and claims to be one of the leading fabricators of plastic film in the middle west.

Nasko Machinery Corp. and **Wolverine Paper Converting Machinery Corp.**, both of Detroit, Mich., manufacturers of aniline printing presses, bag machines, slitters and rewinders, and the hydraulic press, Wolverine Hydro-Printer, have announced the appointment of Frank E. Boughton as midwestern representative, with headquarters at 5040 W. Windsor Ave., Chicago 30, Ill.

Harrison Co., Inc., 4240 27th St., Long Island City, N. Y., has taken over the plastics plant formerly

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THE PLASTISCOPE

operated by **American Injection Molders.** The new firm will do proprietary molding and has two 16 oz., one 10 oz., and two 8 oz. machines. M. J. Harrison is president of the firm, which is represented in the drug trade by A. Wesley Andrew, formerly sundries buyer for United Whalen Drug Co.

Consolidated Molded Products Corp., 309-29 Cherry St., Scranton 2, Pa., which was approved for sale by its parent company, Republic Pictures Corp., has been withdrawn from the market.

Ross and Roberts Sales Co., Inc., has opened new offices and a show room in the Empire State Bldg., 350 Fifth Ave., New York 1, N. Y. The firm functions as exclusive sales and technical field service representative for **Ross and Roberts, Inc.,** West Haven, Conn., manufacturers of unsupported vinyl film to standard and individual specifications.

Blossom Manufacturing Co., Inc., 915 Broadway, New York 10, N. Y., manufacturers of transparent waterproof products, has announced the opening of a showroom at the Chicago Merchandise Mart as an event marking celebration of its Silver Jubilee (1925-1949). The showroom is featuring the complete Blossom line of plastic houseware and novelty merchandise made of Firestone vinyl film.

Acryvin Corporation of America, 18-12 Astoria Blvd., Astoria 2, L. I., N. Y., has announced it will manufacture and sell cast acrylic pearl button blanks, which will be made of all types of cast acrylic pearl sheets. This is said to be the first time these blanks have been offered to the trade and the service is expected to supply a need by many button manufacturers who could use plastics but are not equipped to make blanks.

Koppers Co., Inc., has opened a New England district sales office for its Chemical Div. at 250 Stuart St., Boston, Mass., with J. W. LaBelle as manager.

Tinnerman Products, Inc., Cleveland, Ohio, has opened a new sales branch office in Kalamazoo, Mich., at 132 N. Burdick Ave., with H. J. Greer in charge.

John H. Calo Co., 19 Rector St., New York, N. Y., has been appointed exclusive agents in the Metropolitan area for sales distribution of the Reynolds Metal Co.'s aluminum powders and paste which are widely used as a pigment in the paint and plastics industries. Warehouse stocks will be maintained for prompt service.

Parker-Kalon Corp., 200 Varick St., New York, N. Y., has announced a price reduction of about 11% on all types of its slotted head Hardened Self-tapping Screws widely used in metal and plastic assemblies. The reduction covers both bulk and package quantities and is said to restore prices to the January 1947 level.

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has appointed Dr. James R. Dudley as supervisor of new product development and John D. McPherson as supervisor of market research activities in its New Product Development Dept. This recently formed department is chiefly concerned with determining whether there are economical uses for selected products which have been developed in the company's research laboratories and for which sales applications are not yet established.

Chavannes Industrial Synthetics, Inc., has moved from 404 Fourth Ave., New York, N. Y., to new offices in the General Motors Bldg., 1775 Broadway, New York 19.

Kaye Plastics Corp. has opened a sales office at 7 E. 42nd St., New York, N. Y., with Philip Kaye in charge.

Continental Screw Co., New Bedford, Mass., has appointed Victor Ladetto as sales manager and Donald H. Sleeper as assistant sales manager.

St. Regis Paper Co., 230 Park Ave., New York, N. Y., has appointed regional managers to handle sales of Panelyte decorative laminated plastics, including Harold M. Scott, New York, N. Y., covering the east and southeast; Ed Carow, Chicago, Ill., the midwest; and Robert Chisler, San Francisco, Calif., 11 western states. **Holiday Plastics, Inc.,** Kansas City, Mo., will handle Panelyte's industrial sales in the Kansas City district.

PERSONAL NEWS

Frederick W. McIntyre, Sr., president of the Reed-Prentice Corp., Worcester, Mass., manufacturers of plastic injection molding machines, has been abroad on a five-week business trip in England, France, and Italy, where he observed the operations at many Reed-Prentice installations.

George Babcock has been named sales manager of the Closure and Plastics Div. of Owens-Illinois Glass Co., Toledo 1, Ohio. **Joe Parks,** who has been acting as division manager for closure and plastics sales, has been attached to the staff of **E. F. Schafer,** general branch manager.

Myron A. Wick, Jr. has been appointed vice-president and general manager of Plastic Manufacturers, Inc., Stamford, Conn. He was formerly vice-president and sales manager. **P. Gordon Johnston,** formerly assistant to the sales manager, succeeds Mr. Wick as sales manager.

Robert B. Evans, chief engineer of Standard Tool Co., Leominster, Mass., has been appointed sales engineer and will contact various molders throughout the Eastern part of the country.

Nelson E. Gage has joined the executive staff of Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago 51, Ill., and will serve as manager of the firm's Eastern Div.

Llewellyn S. Howe has been named director of engineering at the manufacturing plant of The Glenn L. Martin Co.'s Chemicals Div., Painesville, Ohio.

S. P. Walsh, formerly with the Formica Co., has joined the sales staff of the United States Plywood Corp., 3354 N. 35th St., Milwaukee, Wis.

Russell D. Hanna has been transferred from the Parlin, N. J., plant of Hercules Powder Co. to its Chicago, Ill., sales office, where he is a member of the firm's cellulose products plastics promotion group.

MODERN PLASTICS CLASSIFIED ADS GET RESULTS!

Classified advertisements in MODERN PLASTICS are an effective, (inexpensive means for buying and selling used plastics machinery, hiring personnel, finding employment and establishing business contacts. These concise notices are read carefully each month by people with specific wants—that's why they get so many "live" responses.

Here are some typical results from recent MODERN PLASTICS classified advertising:

FOR SALE: 1½" extruder	15 replies
WANTED: 2 or 4 oz. injection machine	7 replies
WANTED: Plastic scrap	23 replies
SITUATION WANTED: Sales executive-engineer	8 replies
FOR SALE: Used molds for children's toys	20 replies
WANTED: Manufacturers' representative	8 replies
HELP WANTED: Molding plant supervisor	6 replies
FOR SALE: Plastic advertising and manufacturing novelty business	8 replies

Results like these occur month after month. Rates are surprisingly low and mail box and forwarding service are available at no extra cost. You'll find further information at the top of the following page.

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For further information address Classified Advertising Department, MODERN PLASTICS, 122 East 42nd Street, New York 17, New York

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FOR SALE: 100 Ton and 50 Ton Stokes Molding Press & Pumps; 300 Ton Dunning & Boschert, Molding Press; 300 Ton W. S. New Hobbing Press; 750 Ton Southwark Hobbing Press; 300 Ton W. S. Press 24 x 20 Platens; 175 Ton H. P. M. 30 x 30 Platens; 85 Ton Stewart Bolling 20 x 20 Platens With Electric Plates; 50 Ton 18" x 18" Elmes, With Electric Plates, Handpump Operated; 500 Ton Waterbury Farrel 3 Post Press; 800 Ton Waterbury Farrel 22" x 24" Platens; Stewart Bolling 50 Ton 14" x 14" Platens; 35 Ton Oilgear Shaft Straightener 84" Long Bed; Carver & Watson Stillman Lab. Presses; Hydro Pneumatic & other type Accumulators; Piston & Oil Pumps. AARON MACHINERY CO., 45 Crosby St., N.Y.C.

WANTED: Used injection molder with 8 ounce capacity or more. Herter's, Waseca, Minnesota.

FOR SALE: MOLDING POWDER PLANT EQUIPMENT FROM COMPLETE PLANT. Priced low, immediate delivery. Farrel 18" x 45", 16" x 48" & 15" x 36" two roll motor driven Mixing Mills; Calenders; Rotary Scrap Grinders. Powder & Paste Mixers. Hammer Mills. Pumps. Sifters. 500 ton Hydr. Molding Press 42" x 48"; Field 500 ton 25" x 30"; Francis 200 tons; 24" x 18". Albert 100 ton, 2 opening 24" x 24". Also presses 20 to 250 tons from 12" x 12" to 36" x 36" & 40 ton Broaching Press. Large stock hydraulic pumps and accumulators; Rotary preform Tablet Machines; Injection Molding Machines up to 12 oz; Royle #2 Perfected Extruder; Baker-Perkins 100 & 200 gal. heavy duty Jack. Mixers. High pressure oil fired Boilers. Kettles & Tanks. Laboratory equipment, etc. WE BUY YOUR USED MACHINERY. STEIN EQUIPMENT CO., 90 West St., N. Y. 6, N. Y. WOrth 2-5745.

HYDRAULIC PRESSES REBUILT to specifications for plastic items, industrial purposes and phonograph record presses, producing two per minute. We have in the used equipment (1) Baldwin-Southwark 3" x 8 ft. stroke, 2000# W. P. weighted accumulator $1000, (1) French oil 3" x 42" stroke, 2500# W. P. weighted accumulator, $600, (1) 600 ton, 40 x 48, 18" ram, 36" stroke, 12 ft. daylight $2200, (1) 400 ton, 24 x 48, 18" ram, 24" stroke, $1800, (1) 400 ton, 22 x 30, 16" ram, 18" stroke, 36" daylight $1,500, (2) 150 ton, 42 x 46, 12" ram, 36" stroke, 60" daylight $900 each. (2) 30 ton, 11½ x 11½, 10" double acting ram, 10" stroke, 3 post downward acting self-contained $1000 each, (1) 400 ton Hobbing Press, 20 x 24, 10" ram, 12" stroke, 13½" daylight complete with 2 plunger vertical high and low pressure pump, V belt drive with 3 H. P. motor, $2375.00, (3) 24 x 24, 250 ton Southwark Presses with push-backs, 15½" ram, 15" stroke, 33" daylight $1450 each. Hydraulic Sal-Press Co., Inc., 386-90 Warren Street, Brooklyn 2, New York.

SAVE WITH GUARANTEED REBUILT EQUIPMENT-HYDRAULIC PRESSES: 26" x 24", 13" ram, 400 tons; 36"x36", 19" ram, 425 tons; 24"x42" 340 tons, 2-12" rams; 34"x40" 22" ram, 475 tons; 26"x24", 18½" ram, 800 tons; 24" x 24" 18" ram, 318 tons; 24" x 24", 12" ram, 170 tons; 42" x 42", 16" ram, 250 tons; 36" x 52", 14" ram, 385 tons; 36" x 36", 12" ram, 141 tons; 24" x 26", 10" ram, 118 tons; 20" x 20", 10" ram, 118 tons; 19" x 24", 10" ram, 75 tons; 22" x 15", 8" ram, 75 tons; 15"x15", 8" ram, 75 tons; 12"x12", 7½" ram, 50 tons; 12"x12", 6½" ram, 42 tons; 8"x9½", 4½" ram, 20 tons; 16"x16", 3½" ram, 12 tons; Laboratory press 30 tons 6"x6"; NEW DUAL PUMPING UNITS, ALL SIZES; Worthington Triplex 12 gal. 2200#, 4 plunger 6 gal. 2000#; Watson Stillman duplex box type 1 gal. 2500#; Worthington 1 gal. 10000#; NEW LABORATORY 6"x12" M. D. MILLS; Thropp 16" x 40" M. D. MILL; EXTRUDERS, NRM size 1½" and 2½" Units; PREFORM MACHINES; Stokes R&T, Colton 5 & 5½ T Mixers. Accumulators, Vulcanizers, etc. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York City 13, N. Y.

FOR SALE—1—Watson Stillman Hydro-Pneumatic High and Low Pressure Accumulator System, complete; 1—Van Dorn Experimental Injection Molding Machine; Other Injection Molders up to 22 oz; 2—150 Ton Semi-Automatic Self-Contained Hydraulic Presses; 1—Royle #1½ Plastic Extruder 1¼" cylinder, other up to 8" cylinders; Two Roll Compounding Mills 6 x 12" up to 22 x 60"; Complete equipment for manufacture of molding powders. Send us your inquiries. CONSOLIDATED PRODUCTS CO. INC., 13-14 Park Row, New York 7, N. Y.

(15) AUTOMATIC UNITS—Hydraulic Baldwin Southwark 50 ton automatic tilting head press serial #45580. Taylor Flex-O-Timer No. 179RJ311, 23 x 40 steam plate and double shelf table, (1) 1¼" hydraulic high and low air diaphram valve, (2) ¾" hydraulic air diaphram valves, (1) Vickers high and low pumping unit, 5 H.P. motor, regulating valves, 70 gallon tank, and cooling system. Price $1800.00. HYDRAULIC SAL-PRESS CO., INC., 386-390 Warren Street, Brooklyn, N. Y.

PLASTIC VINYL SCRAP — Bought and Sold. Flexible and Rigid. Sterns Plastic Products Co., 1686 Fulton St., Brooklyn 13, N. Y., PR 2-9215.

MANUFACTURERS REPRESENTATIVES WANTED
Old line midwest molder desires to enlarge sales force. Representatives needed for New England, New York City, St. Louis, Kansas City, Minneapolis, Dallas, Los Angeles. Prefer men with engineering and sales experience. We have complete facilities to design, engineer, build molds, and mold all materials. Commission basis. Reply stating qualifications. Reply Box C919, Modern Plastics.

IF YOU HAVE GOOD HYDRAULIC PRESSES with modern pumping equipment for sale send me your specifications of same with photo, and I will see to it that you will get the best price available. Announcing: Hydraulic Sal-Press Co., Inc., formerly Sal's Press, located at 386-390 Warren St., Brooklyn, N. Y. Will continue to render its usual good service.

BUSINESS WANTED
Design Engineer-Executive with outstanding record in building sales volume for industry through new product design and development. Would like to purchase, for cash, sound established manufacturing company, in eastern U. S., doing a volume over $400,000. Would also consider purchase of interest in company with active participation in management. Full information first letter. Box C952. Modern Plastics.

PLASTICS ENGINEER AVAILABLE—Organic chemistry, engineering background. Long valuable experience in molding and fabricating all commercial plastics. Strong on material selection, estimating, molding and finishing techniques, trouble-shooting, compound and product evaluation testing. Good knowledge of proper product, mold and accessory tool, and equipment design for sound economical production. Primarily product and process development man; initiative, hardworking, ability as manager. Reply Box C959, Modern Plastics.

PATENT RIGHTS for sale or License. Patent, 2,415,209, GROMMET SPINDLE. Pat. Feb. 4th 1947. A moulded, all-plastic, grommet spindle for use in manually producing cotton string grommets which are essentials in ship building and repairing. Figures embossed on the ends of the spindles indicate the diameter of the spindle. Accurate measurements; flexible molding at low cost; international markets. Write, Morten B. Michelsen, Antonito, RFD 164, Colorado. (Group 37-31-32-30-81. .Register No. 8,195.)

LINES WANTED
Sales representative, New York specializing in 5¢ to $1.00 items suitable for big Chain Stores, desires to contact manufacturers of plastic specialties, housewares, toys, notions, stationery or novelties. I have over 20 years experience, an extensive following and can market your products in volume. Commission basis. Reply Box C867 Modern Plastics.

RESIN CHEMIST AVAILABLE
B.S. Degree, 37 years old, thoroughly experienced in research, quality-control, production, and technical service of urea-formaldehyde, phenol-formaldehyde, and rescorcinol-formaldehyde resins for adhesives, impregnating and laminating varnishes, wet-strength paper, and treatment of textiles for anti-shrink and crease-resistance. Reply Box C928 Modern Plastics.

EXTRUDER AND MOLDER—WILL buy Polyethlene or Polythene any color—1. Virgin material. 2. Reground material. 3. Sheet stock trimmings. 4. Other. Write us formula, quantity, color and condition. Reply Box C909, Modern Plastics.

LUCITE AND PLEXIGLAS
.060 CLEAR GRADE-A 20¾ x 15¾" BELOW LIST. .080 75¢ per sq.ft., .100 80¢ per sq.ft. .125 90¢ per sq.ft., .187 $1.10 per sq.ft. .250 $1.30 per sq.ft. No charge for cutting to size.
Aristocrat Plastics, Inc., 55 Clarkson St., N.Y.C.

SCULPTOR DESIGNER and model-maker, having diversified background conceiving and creating originals for the plastics industry. Experience includes responsible positions in leading plastics toy and novelty companies. Specialist in animal and figure work, animated characterization, or realistic. Part-time, free-lance, Maurice Winters, 66 Jane Street, New York City 14. Tel. ORegon 5-2353.

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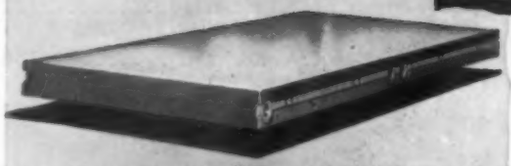

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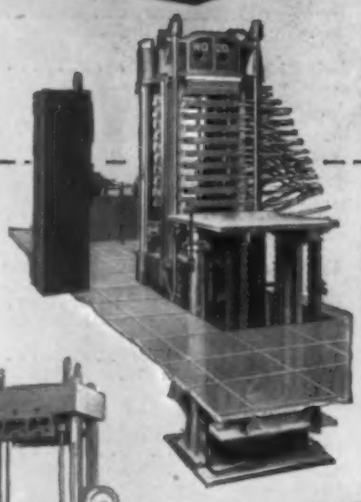

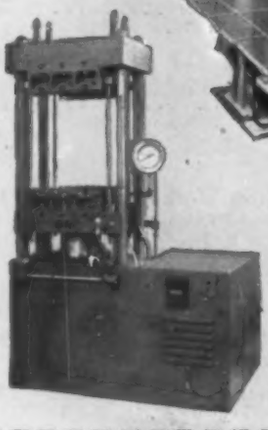

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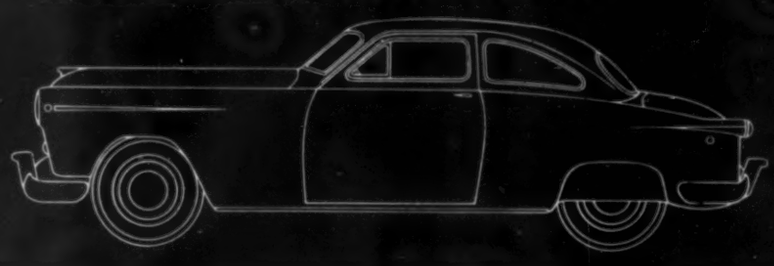
This is the first in a series indicating the purchasing power of the plastics market in specific vertical fields where plastics are used, fabricated and molded.

THE AUTOMOTIVE INDUSTRY...



$37,000,000* of finished plastic parts in 1949!

An average 1941 automobile used 7½ pounds of plastics. The average 1949 model uses almost twice that much, exclusive of so-called "accessories." And the auto industry expects to deliver about five million units in 1949.

While the bulk of the plastics components used by the industry are furnished by custom molders and fabricators, some auto manufacturers now have plastics divisions which supply part of their requirements. **estimated*

In the highly concentrated automotive field (comprising less than a score of major companies), MODERN PLASTICS reaches the executives, engineers and technicians who influence and make decisions on methods and materials. These men, by virtue of their job interests and their readership of MODERN PLASTICS, are *pre-conditioned* in favor of plastic applications wherever suitable. They recognize the desirability of such applications and are constantly alert to the advantages of better plastics materials and better methods of plastics fabrication.

The automobile industry, though a major consumer of plastic materials, machinery and services†, represents only *one* segment of the total circulation of MODERN PLASTICS Magazine. The full distribution of 17,600 net paid copies reaches similar major buying influences in other basic industries which buy, mold, and fabricate plastics parts and products.

We will be glad to send you additional information on the plastics market to help you evaluate your sales potential in it. Write now for the free 42-page data file "The Plastics Industry, What It Buys and How To Sell It."

†*Reporting on the sales outlook for 1949,* SALES MANAGEMENT *Magazine gave both the auto and plastics industry its top "5 star" rating for the best relative outlook this year.*

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A BRESKIN PUBLICATION

MODERN PLASTICS MAGAZINE

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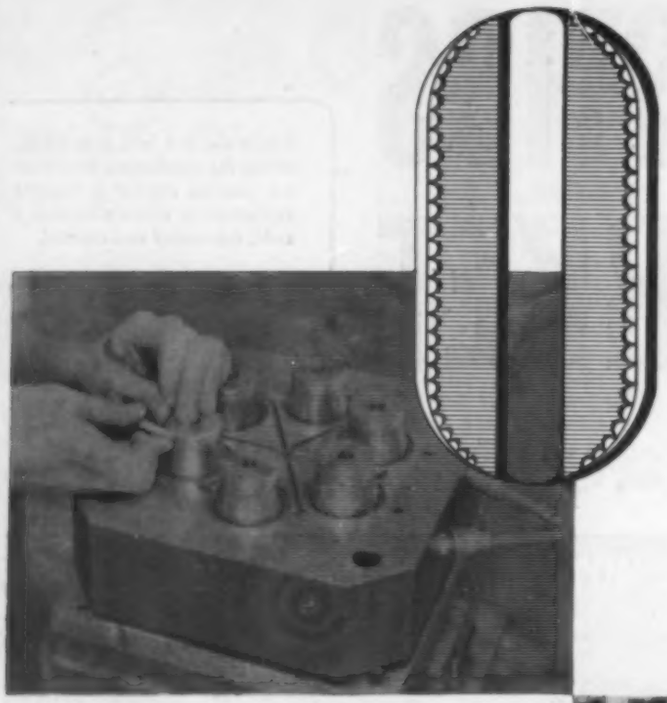
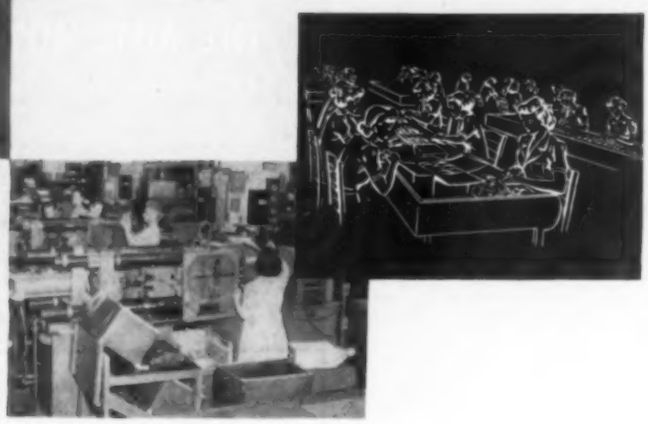


ur Custom Moulding Service Assures You Every Advantage in Plastic Production



Regularly, new customers needing a design for a new plastics product or looking for a plastic approach to an old one pay a profitable visit to our plant. By giving us an opportunity to get in on the "ground floor" planning, we have come up with design and production suggestions time and again, that have brought the finished article well within the customers' budgeted costs. You, like so many of our other customers, will discover many advantages in our "under one roof," complete injection moulding service. Plastically speaking, *our* whole plant is *your* plastics department. Our die designers, die makers, moulders, finishers and inspectors concentrate solely on the successful manufacture of our customers' products. These advantages have spelled many a plastic success, which may very well include one for you.

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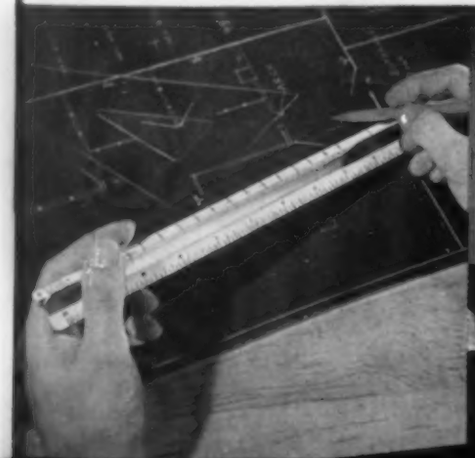

PRINTING TO CLOSE TOLERANCES is easily accomplished on VINYLITE Plastic rigid sheet before forming, making it ideal for standout three-dimensional displays. This by Stanley Wessel & Co.

DURABILITY, transparency, good appearance are inherent in this VINLYITE Plastic rigid sheet Harley-Davidson motorcycle windshield by Midland Plastics, Inc. and G. Felsenthal & Sons, Inc.

MOLDED IN PLASTICS BY GENERAL ELECTRIC

LARGE-VOLUME JOBS! G. E. is ideally equipped to mold large quantity jobs-like parts for the Ocean City Manufacturing Co.'s surf casting reel.
PLASTICS FOR DISPLAY! The attractive housing of this Spur syrup dispenser was molded by G. E. for Canada Dry.
LOW SELLING PRICE! Using G-E plastics for a paper cup dispenser enables the Dixie Cup Company to offer an attractively priced home unit.
Plastics

How G-E Plastics Can Help You BOOST YOUR SALES VOLUME

When designers wanted the answer for a line of low-priced, large-volume television cabinets that would compete in eye-appeal and appearance with natural woods, General Electric molders got it for them!

Selecting the proper phenolic compounds to do the job, G-E molders improved existing designs, produced a rich-looking plastics cabinet on large-volume runs . . . and at a cost well below that of natural woods. This helps make it possible to market the set at a price substantially lower than previous models.

This television cabinet is another example of what General Electric's complete *plastics service might do for* your *product.*

For low cost and high quality, depend on General Electric's plastics service! One of the world's largest plastics molders, G. E. is ideally equipped for large-volume *production. WRITE US FOR MORE INFORMATION on how this service can work for* you. *Or contact your nearest G-E sales office. Address: Plastics Division, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Mass*

GENERAL ELECTRIC

CD45-A48

General Electric plastics factories are located in Coshocton, Ohio, Decatur, Ill.; Taunton and Pittsfield, Mass.